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# Risk Assessment for ship-mediated introductions of aquatic nonindigenous species to the Great Lakes and freshwater St. Lawrence River

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# Évaluation du risque d'introduction d'espèces aquatiques non indigènes par les navires dans les Grands Lacs et la partie d'eau douce du fleuve Saint-Laurent

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## ABSTRACT

Ballast water has historically been the predominant ship-mediated vector for aquatic nonindigenous species (NIS) introductions to Canada, while hull fouling is recognized as a leading sub-vector for the introduction of marine aquatic NIS worldwide. At least 182 aquatic NIS have established in the Great Lakes, making this one of the most highly invaded ecosystems globally. A series of regulatory changes enacted by Canada and the United States have slowed the rate of invasion and facilitated changes in invader characteristics. The objective of this report was to conduct a relative risk assessment of shipping vectors (hull fouling and ballast water) to the freshwater ports in the Great Lakes and the St. Lawrence River (GLSLR). First, the probability of introduction was estimated by combining the individual probabilities of successful transition through each stage of the invasion process (i.e., arrival, survival and establishment) based on ship arrival/ballast water discharge data and environmental conditions at GLSLR and potential source ports. Second, the potential magnitude of consequences of introduction was estimated based on the number of high impact ship-mediated NIS recorded for eco-regions of ports directly connected to GLSLR ports through shipping activities. The probability of introduction and potential magnitude of consequences were then combined for a final relative invasion risk rating. Finally, we identify priorities and make recommendations for future management needs.

A transit analysis shows that GLSLR ports are connected with international and coastal domestic ports, resulting in potential for species transfers *via* hull fouling and ballast water discharge. Laker vessels (those that operate exclusively in the GLSLR) appear to be the most important transport pathway of fouling and ballast-mediated NIS in the region. The final relative invasion risk for fouling NIS is intermediate for Montréal (Québec), Québec City (Québec) and Duluth-Superior (Minnesota-Wisconsin), and lower for the remaining top ports, with moderate uncertainty. The final invasion risk for ballast-mediated NIS is higher for Duluth-Superior, intermediate for Québec City and Montréal, and lower for the remaining top ports, with moderate uncertainty. It is important to note that results presented in this document are based on relative rankings among GLSLR top ports. Ports identified as higher risk in this study may not be high risk in a national scale considering the relatively low international shipping traffic in the region; these ratings will be recalibrated to differentiate risk among top ports from all Canadian regions in a subsequent national risk assessment.

# RÉSUMÉ

Au Canada, l'introduction d'espèces aquatiques non indigènes par les navires se produit surtout au niveau des eaux de ballast, alors qu'à l'échelle mondiale, ce sont les salissures biologiques de la coque des navires qui sont reconnues comme principal sous-vecteur d'introduction. Au moins 182 espèces aquatiques non indigènes se sont établies dans les Grands Lacs, ce qui en fait l'un des écosystèmes les plus envahis au monde. Le Canada et les États-Unis ont modifié leur réglementation, permettant ainsi de réduire le taux d'invasion et de faciliter le changement des caractéristiques des espèces envahissantes. Ce rapport a pour objectif de conduire une évaluation relative des risques liés aux vecteurs d'introduction par navire (par les salissures biologiques de la coque et les eaux de ballast) dans les ports d'eau douce des Grands Lacs et du fleuve Saint-Laurent. Tout d'abord, la probabilité d'introduction a été estimée en combinant les probabilités de transition réussies à chaque étape du processus d'invasion (c.-à-d. l'arrivée, la survie et l'établissement), selon les données sur l'arrivées des navires et le déchargement des eaux de ballast et les conditions environnementales des Grands Lacs, du fleuve du Saint-Laurent et des ports d'origine potentiels. Deuxièmement, l'ampleur potentielle des conséquences de l'introduction a été estimée selon le nombre d'espèces non indigènes à fort impact étant associées aux bateaux dont les itinéraires connectaient les écorégions des Grands Lacs et du fleuve St-Laurent à des ports d'où peuvent provenir certaines espèces non indigènes. La probabilité d'introduction et l'ampleur des répercussions potentielles ont ensuite été combinées pour déterminer le risque final d'invasion. Enfin, nous avons établi les priorités et formulé des recommandations relativement aux besoins de gestion future.

Une analyse du transit montre que les ports des Grands Lacs et du Saint-Laurent sont reliés à des ports internationaux et nationaux ce qui favorise le transfert potentiel des espèces par l'entremise des salissures biologiques de la coque des navires et des eaux de ballast. Les cargos hors mer (qui ne se déplacent que sur les Grands Lacs et le fleuve Saint-Laurent) semblent constituer la voie de transport du plus grand nombre d'espèces aquatiques non indigènes par le biais des salissures biologiques de la coque et des eaux de ballast dans la région. Le risque relatif final d'invasion de telles espèces introduites par les salissures est intermédiaire à Montréal (au Québec), à Québec (au Québec) ainsi qu'à Duluth-Superior (au Minnesota-Wisconsin) et faible dans les autres ports principaux, avec un degré d'incertitude modéré. Le risque final d'invasion d'espèces aquatiques non indigènes introduites par les eaux de ballast est élevé à Duluth-Superior, intermédiaire à Québec ainsi qu'à Montréal et faible dans les autres ports importants, avec un degré d'incertitude modéré. Il est important de noter que les résultats présentés dans ce document sont basés sur des classements relatifs parmi les principaux ports des Grands Lacs et du Saint-Laurent. Les ports déterminés comme présentant un risque plus élevé dans le cadre de cette étude peuvent ne pas présenter de risque élevé à l'échelle nationale si l'on tient compte du trafic maritime international relativement faible dans la région; ces résultats seront revus dans le cadre d'une évaluation nationale du risque visant à déterminer le risque des principaux ports des régions canadiennes.

# INTRODUCTION

Species that have established populations outside of their native range are known as nonindigenous species (NIS). The impact of NIS invasions has become increasingly problematic as globalization has increased both intentional and unintentional species transfers, allowing the establishment of NIS worldwide. NIS may impact recipient ecosystems by competing with native species for limited resources and disrupting the natural food web (Shea and Chesson 2002). In fact, NIS introductions are the second greatest cause of extinction globally and the greatest threat to biodiversity in freshwater ecosystems (MEA 2005; Lawler et al. 2006). NIS have caused irreparable damage to ecosystem function and natural resources in many terrestrial and aquatic systems (Carlton and Geller 1993; Allen and Humble 2002; Crooks 2002; Pimental et al. 2005). Resultant long-term economic consequences have impacted industry and society both directly and indirectly amounting to costs between $13.3 and $34.5 billion/year in Canada alone (Mack et al. 2000; MEA 2005; Colautti et al. 2006*a*). Examples of aquatic NIS impacts include the depletion of commercially important fisheries, increased industrial maintenance costs from NIS-fouled equipment, and the need for ongoing, costly mitigation programs. All ecosystems are vulnerable to, and may suffer severe impacts from, NIS unless comprehensive prevention and management programs are introduced (United States Congressional Office 1993).

The objective of this report is to conduct a semi-quantitative, relative risk assessment of two shipping vectors (hull fouling and ballast water) to freshwater ports in the Great Lakes and St. Lawrence River (GLSLR), as a sub-component of a national risk assessment for the four coasts of Canada (including also the West Coast, East Coast and Arctic Coast). Once all regional documents are completed, a national risk assessment will be completed which re-evaluates the relative risks on a national scale and addresses the following questions posed to the authors by formal science advice request in advance of the project:

1. What is the level of risk posed by ships transiting to, or from, Arctic ports for the introduction of AIS to Canadian waters;
2. What is the level of risk posed by ships operating within the ballast water exchange exemption zones on the East and West Coasts;
3. What is the level of risk posed by domestic shipping activities; and
4. Do current ballast water management regulations provide sufficient protection against ship-mediated AIS introductions?

In general, each regional report will provide a synopsis of biological invasion theory, the role of shipping vectors in species introductions, the history and concerns of AIS in the region, and the risk assessment. This particular document provides guidance on the relative risks of ship-mediated introductions within the GLSLR. This risk assessment is based upon the best available information and methodology, and was peer-reviewed at a workshop attended by international aquatic invasive species, shipping and risk assessment experts and was overseen by DFO's Centre of Expertise for Aquatic Risk Assessment.

## THE BIOLOGICAL INVASION PROCESS

Founding individuals, known as propagules, must pass through multiple stages of the invasion process to be successfully introduced to a new location (Figure 1). First, the propagules must be taken up by, and survive conditions within, a transport vector to be moved from the source region to a new environment. Once released, the propagules must survive in the new environment. If enough propagules successfully arrive, survive and form a reproductive population (Establishment), the recipient habitat can then act as a new source of propagules for secondary spread, making the process cyclical. The successful transition between any two stages of the invasion process is dependent on at least three factors: propagule pressure, physical-chemical requirements and biological requirements. Propagule pressure is a measure of the number of propagules released per event coupled with the number of release events over a given time period and is positively related to the probability of introduction (Wonham et al. 2000; Kolar and Lodge 2001; Colautti et al. 2006*b*). Physical-chemical and biological requirements also directly affect transition between invasion stages, with inhospitable environmental conditions (e.g., intolerable temperature, salinity, or substrate type) or community interactions (e.g., severe predation or limited food supply) decreasing the probability of introduction (Lockwood et al. 2006, 2009). Efforts to manage NIS introductions can target any or all stages of the invasion process, although preventative efforts focused at reducing propagule pressure at the transportation stage are regarded as most effective and cost-efficient (ISSG 2001; ANSTF 2007). Since transportation vectors are numerous, risk assessments identifying priority or high-risk vectors are necessary to direct limited resources for control efforts.

## THE ROLE OF SHIPPING AS A PATHWAY OF AQUATIC NIS INTRODUCTIONS

Transportation vectors for aquatic NIS in Canada's freshwater and marine ecosystems include intentional (i.e., authorized stocking programs) and unintentional releases of aquatic species. Unintentional releases are associated with commercial shipping activities (e.g., ballast water discharge or hull fouling), escape from aquaculture facilities, and unauthorized releases of aquarium, bait fish, and ornamental pond species. Commercial shipping activities are of particular interest because shipping has been implicated in a substantial number of aquatic invasions globally and management strategies for this vector are relatively straight-forward and enforceable (Carlton 1985; Ruiz et al. 2000; MacIsaac et al. 2002; Leppäkoski et al. 2002; Grigorovich et al. 2002, 2003, Ruiz and Carlton 2003).

Ballast water has historically been the predominant ship-mediated vector for aquatic NIS introductions to Canada (Ricciardi 2001; de Lafontaine and Costan 2002). Natural adjacent water is pumped into ballast tanks to control the trim, stability and stresses on operational ships. Diverse communities of plankton present in the water column may be inadvertently pumped into ballast tanks during water uptake, transported to the destination port and subsequently released (Carlton 1985). In this way, ballast water transfer allows plankton to travel distances far greater than natural dispersal via active or passive mechanisms (Locke et al. 1993; Minton et al. 2005). Port sediments, and the associated benthic community, can also be resuspended and entrained in ballast tanks during uptake of ballast water (Bailey et al. 2003; Duggan et al. 2005; Kipp et al. 2010). Suspended sediments can settle out of ballast water and accumulate on the bottom of ballast tanks, providing good habitat for benthic life stages and resting eggs and serving as an additional transport vector for NIS (Bailey et al. 2005; Duggan et al. 2005, 2006). The amount of sediment and associated fauna resuspended and released during ballast discharge is thought to be low, but studies indicate ballasting operations may promote hatching of resting stages within ballast tanks such that individuals can enter the water column and be available for release (Bailey et al. 2005). Furthermore, water-sediment slurries may form in tanks with only residual ballast, providing an intermediate medium for NIS survival and introduction to recipient waters (Sutherland et al. 2009). The transfer of aquatic NIS *via* ballast water, slurry or sediment can be managed by regulating ballast practices since ballast water discharge is required to ultimately release individuals from ballast tanks. Conversely, the transport and release of taxa associated with the external underwater surfaces of a vessel, is not directly dependent on the ship's ballast activities and is more difficult to manage (Carlton 1985; Minchin and Gollasch 2003). Ship hulls, sea chests, propellers and other underwater surfaces can harbour fouling organisms, such as algae, hydroids, bryozoans, barnacles and bivalves (i.e. sessile taxa), in dense colonies that offer crustaceans and other motile organisms structural habitat and protection against the shearing forces experienced during ship movement, hereafter generalized as 'hull fouling' (Gollasch 2002; Lewis et al. 2004). Fouling taxa can be detached from the hull or can release reproductive propagules at any time along a vessel transit, thereby potentially establishing a nonindigenous population in any location through which the vessel travels. In fact, hull fouling is recognized as a leading vector for the introduction of marine aquatic NIS worldwide (Carlton 1985; Gollasch 2002; Coutts et al. 2003). Anchor chains, which are submerged in water at port and relatively protected during transit, are an additional, potentially important mechanism of ship-mediated introductions (West et al. 2007). However, because anchor chains are understudied as a vector of introductions, we are not able to assess its relative importance here. While shipping activities may also be important vectors for terrestrial NIS introductions through the movement of wood dunnage and/or infested cargo containers, the analysis of ship-mediated terrestrial introductions is beyond the scope of this study.

Ship type, ship size and trade patterns influence the invasion risk associated with a given vessel and the relative risk posed by each vector within that vessel (Simkanin et al. 2009). Vessels that rely heavily on ballast water for cargo operations, such as bulk carriers and tankers, are high-risk for transportation of aquatic NIS *via* ballast water and sediment. Risk is concordant with ship size since ship size influences the amount and capacity of ballast tanks. Vessels that do not regularly discharge ballast water, such as passenger vessels, barges and tugboats, are less important for introductions *via* ballast water and sediment. Trans-oceanic vessels have been considered to be most high-risk for aquatic NIS introductions because they provide a mechanism for the fauna of distant ports to be exchanged (Carlton 1985), however domestic or coastal vessels have the potential to contribute to the secondary spread of established aquatic NIS (Humphrey 2008; Simkanin 2009; Sutherland et al. 2009; Rup et al. 2010).

More recently, hull fouling has been identified as an important vector of marine NIS. In contrast to ballast water, ship type does not influence risk because all vessels have the capacity to transport fouling organisms on exterior surfaces, regardless of ballasting practices. Like ballast water, the risk associated with hull-fouling introductions can increase with ship size, because larger ships have a greater underwater surface area on which propagules can attach. Hull fouling risk is also influenced by season, mooring time, elapsed time since antifouling application, vessel speed and trade route (Coutts 1999; Ruiz and Smith 2005; Sylvester and MacIsaac 2010). As mooring time and/or time since last antifouling coating increase, the risk associated with a given vessel increases because more fouling organisms are able to accumulate (Coutts 1999; Sylvester and MacIsaac 2010). The invasion risk decreases as vessel speed increases, because high speeds can remove or kill organisms attached to the hull (Coutts and Taylor 2004). In addition to the level of risk, trade patterns influence the type of introductions that can be expected from a vector. In the case of hull fouling, the shipping route influences the conditions to which organisms are exposed during transit thereby influencing survival rates. Ships that trade coastally are more likely to be a risk for invasion than ships that must pass through high-salinity oceanic waters (Sylvester and MacIsaac 2010). However, some fouling organisms, such as bryozoans and isopods, are capable of surviving broad changes in salinity (0 – 37 ppt), temperature (9.9 – 31.6 °C), latitude (32°) and longitude (43°) (Davidson et al. 2008).

Consideration of factors affecting NIS introductions can be used to better predict high-risk introduction vectors for Canada. Given that these factors will affect invasion risk in different ways for different recipient regions, risk must be assessed separately for the different regions of Canada. Here, we conduct a risk assessment for ship-mediated introductions of aquatic NIS to freshwater ports in the Great Lakes and St. Lawrence River (GLSLR) as a sub-component of a national risk assessment for ship-mediated introductions to Canada.

## BALLAST WATER MANAGEMENT REGULATIONS

While invasion rates have steadily increased over the past 150 years in the Great Lakes, a series of regulatory changes enacted by Canada and the United States have slowed the rate of invasion and facilitated changes in invader characteristics (Dextrase 2002; Bailey et al. 2011). Here we will review Canadian, American and International regulations applicable to the region, highlighting the changes that have occurred over time.

Ballasted transoceanic ships have been considered risky for aquatic NIS introductions because each ship can discharge a large volume of ballast which can contain a large number of propagules. On average, ships in the Great Lakes region discharge 5,190 $m^3$ of ballast water, whereas ships in the Pacific and Atlantic regions discharge 13,915 $m^3$ and 39,842 $m^3$ respectively (Humphrey 2008). To prevent aquatic NIS introductions in the GLSLR, Canada adopted the 'Voluntary Guidelines for Control of Ballast Water Discharges from Ships Proceeding to the St. Lawrence River and Great Lakes' in 1989 (Transport Canada 2007). These guidelines encouraged all ships to perform ballast water exchange (BWE) outside the Economic Exclusive Zone (located at 200 nautical miles from the coast) and in locations where depths are not less than 2,000 m. In 1993, BWE was made mandatory by the United States, requiring all transoceanic vessels travelling to the Great Lakes with ballast water to complete BWE at sea (USCG 1993). In 2000, Canada established mandatory regulations requiring all vessels entering and operating in Canadian waters, that are at least 50 m in length with a minimum ballast capacity of eight $m^3$, to undertake ballast water exchange at sea (Transport Canada 2007), with following exceptions:

(i) ships that operate exclusively in Canadian waters,
(ii) ships that operate exclusively in the American waters of the Great Lakes or the French waters of St. Pierre and Miquelon when outside Canadian waters,
(iii) search and rescue vessels,
(iv) vessels used in government non-commercial service,
(v) ships that carry only permanent ballast in sealed tanks.

Ballast water exchange is a process in which a ship exchanges ballast water loaded near shore with open-ocean saltwater. Empirical studies indicate that BWE purges 80 – 100% of coastal planktonic organisms entrained at the source port and is particularly effective (>99%) in reducing the abundance of freshwater taxa (Gray et al. 2007; Ruiz and Reid 2007; Bailey et al. 2011). It is hypothesized that any open-ocean taxa present in exchanged ballast tanks will not thrive in coastal and freshwater environments and will be low-risk for invasion. To maximize BWE efficacy, vessels practicing empty-refill exchange must replace a minimum of 95% of their ballast water, whereas flow-through exchange must pump through a minimum of three tank volumes through each ballast tank (Canada Shipping Act 2006). Ballast water exchange must occur ≥ 200 nautical miles from land where water depth is ≥ 2000 meters and must achieve a final salinity of ≥ 30 parts per thousand (Canada Shipping Act 2006). If the vessel does not pass an area that meets the minimum requirements during its voyage, Canada will accept exchange in an area ≥ 50 nautical miles from shore where the water depth is ≥ 500 meters (Levings and Foreman 2004). There is also an alternate exchange zone in the Laurentian Channel east of 63°W longitude available for vessels which are unable to successfully complete ballast exchange before entering the GLSLR that can be utilized between December 1 and May 1 after receiving permission from Transport Canada.

Prior to 2006, ships declaring no ballast on board (NOBOB) were exempt from BWE because ballast tanks were considered empty by industrial standards. Further research revealed that ships declaring NOBOB can contain tonnes of unpumpable residual water, slurry and/or sediment that may introduce NIS during multi-port ballast operations (Bailey et al. 2003; Colautti et al. 2003; Duggan et al. 2005; Sutherland et al. 2009). The risk was considered significant at least for the Great Lakes, where ships declaring NOBOB can represent up to 90% of vessel traffic (MacIsaac et al. 2002; Colautti et al. 2003). As a result, Canada implemented the *Ballast Water Control and Management Regulations* requiring tank flushing of unpumpable residuals as well as BWE, such that all ballast tanks entering Canadian waters are managed (Canada Shipping Act 2006). Similar to BWE, tank flushing involves rinsing 'empty' tanks with open-ocean water in an area ≥ 200 nautical miles from shore to achieve a final salinity of ≥ 30 parts per thousand (Transport Canada 2007; SLSDC 2008). Additionally, the uptake of sediment must be minimized, must be monitored and removed on a regular basis, and, when possible, should be deposited at a reception facility.

Further, the U.S. Coast Guard, Transport Canada, and the two St. Lawrence Seaway Corporations formed a Ballast Water Working Group to standardize inspection and enforcement for ships on the Seaway in 2005. Regulations have been strictly enforced and inspection rates reached 87% by 2006 (Bailey et al. 2011). Approximately 10% of ballast tanks (630 tanks) of ships arriving to the Great Lakes and St. Lawrence River between 2005 and 2007 were non-compliant with exchange regulations (Bailey et al. 2011). Non-compliant ships are required to either (i) retain all non-compliant ballast water on board while in Canadian waters, (ii) exchange ballast water at a specified location, (iii) discharge ballast water at a specified location, or (iv) treat ballast water in accordance with an approved method (Canada Shipping Act 2006). As of yet, no alternative treatments have been approved, although ongoing research is evaluating the efficacy of sodium chloride brine as an emergency treatment for non-compliant tanks (Bradie et al. 2010; Wang 2011).

The International Maritime Organization (IMO), an agency of the United Nations that works to improve maritime safety and prevent pollution from ships, introduced the *International Convention for the Control and Management of Ships Ballast Water and Sediments,* also known as the Ballast Water Convention in February 2004 (IMO 2004). This convention set maximum allowable discharge limits, known as the IMO D-2 discharge standard, for organisms and indicator microbes released with ballast water after ballast treatment. In addition to maximum discharge limits, the Convention requires that BWE be completely phased out and replaced by on-board treatment systems by 2016. There are at least 41 treatment systems in development that use various mechanisms such as filtration, biocides, heat exposure, electric pulse treatment, ultraviolet rays, ultrasound, magnetic fields, deoxygenation, and antifouling coatings to eliminate ballast water taxa (NRC 1996; Environment Canada 2007; Lloyd's Register 2007; Mamlook et al. 2008). Presently no treatment systems have been approved for freshwater; no treatment systems have been approved for use in Canada.

Domestic vessels are exempt from current ballast water regulations, but those operating in the GLSLR are required to observe the *Voluntary Management Practices to Reduce the Transfer of*

*Aquatic Nuisance Species Within the Great Lakes by U.S. and Canadian Domestic Shipping* established in 2001 (GLSLS 2009). These regulations recommend vessel operators should (i) conduct ballasting operations in deep water when possible, (ii) maintain ballast records, (iii) inspect sediment accumulation annually, (iv) clean ballast tanks to remove sediment when necessary, and (v) co-operate with scientific sampling, analysis and testing programs when possible.

## HISTORY OF AQUATIC NIS IN THE GREAT LAKES AND THE ST. LAWRENCE RIVER

The Laurentian Great Lakes form the world's largest freshwater system, holding 21% of the world's water supply and covering 244,000 km$^2$ (U.S. EPA 2006). The Great Lakes is one of the most ecologically diverse areas in North America, containing a variety of unique habitats that provide a home for over 150 fish species and 50 native plant communities (OMNR 2009). The St. Lawrence River, which contains freshwater, brackish-water and marine regions, connects the Great Lakes to the Atlantic Ocean (Figure 2). Natural barriers prevented large ocean-going ships from traversing the entire passage until 1959, when a series of locks and canals were constructed and the Great Lakes St. Lawrence Seaway was opened. The Seaway stretches 3,700 km and supports the livelihood and activities of 25% of Canada's population (GLSLS 2007). It is home to 15 major ports and 121 regional ports, and is controlled by the St. Lawrence Seaway Management Corporation (Canada) and the St. Lawrence Seaway Development Corporation (U.S.) (GLSLS 2009; Rup et al. 2010).

The establishment of aquatic NIS is the greatest environmental problem threatening the Great Lakes (GLSLS 2007). Invasion rates and patterns have changed over time and these changes can be attributed to the evolution of the Seaway and changes in the shipping vector. Before 1900, ships used solid ballast, such as rock, sand, and mud, in place of ballast water. Solid ballast often contained seeds and terrestrial insects and it was not uncommon for nonindigenous plant and insect species to be found in locations where ballast was commonly discharged (Mills et al. 1993; Ricciardi 2006). When technological advances permitted use of ballast water to replace solid ballast, the influx of terrestrial NIS slowed and aquatic NIS became more prevalent; since ballast water intake screens do not exclude the uptake of small organisms, a series of fish, zooplankton and phytoplankton invasions occurred (Ricciardi 2006). Historically, most established aquatic NIS in the Great Lakes originated from Europe or Asia, and 69% of recent invaders originate from the Ponto-Caspian region (de Lafontaine and Costan 2002; Ricciardi 2006). These individuals are likely the result of secondary introduction events after establishment in the Baltic Sea and lower Rhine River areas (Colautti et al. 2003). In total, at least 182 aquatic NIS have established in the Great Lakes, making the system one of the most highly invaded ecosystems globally (Mills et al. 1993; Dextrase 2002; Ricciardi 2006). Approximately 58 – 85% of the established aquatic NIS result from unintentional introductions and 55 – 70% of these invaders have been transported to the Great Lakes by ballast water (Mills et al. 1993; Ricciardi 2001; Holeck et al. 2004; Ricciardi 2006; NRC 2008). The requirement for BWE and tank flushing appears to have significantly decreased the risk of ballast-mediated invasions in the GLSLR (Bailey et al. 2011), although these strategies do not provide 100% protection. A series of salinity-tolerant invaders discovered in the Great Lakes in the late 1990s and early 2000s indicates that further management of ballast water may be warranted or that alternate vectors of introduction needed to be addressed (Grigorovich et al. 2003; Duggan et al. 2005; Ricciardi 2006).

Much destruction has accompanied invasions to the Great Lakes as is well illustrated by high-impact invaders such as the sea lamprey (*Petromyzon marinus)* and zebra mussel (*Dreissena* *polymorpha)*. The parasitic sea lamprey entered the Great Lakes *via* the Erie Canal in the 1820s (GLSLS 2009) and preyed on native fish, contributing to a massive decline in Great Lakes fish populations and major losses in commercial fisheries revenues. Zebra mussels, which were first reported in Lake St. Clair in 1988 and likely introduced *via* ballast water discharge (Mills et al. 1993), have caused extensive damage by altering the physical and chemical properties of the Great Lakes water and outcompeting native species. Zebra mussels have caused problems for industry by fouling water intake valves and other industrial equipment and have cost Canadians hundreds of millions of dollars in control and eradication programs (Dextrase 2002). The Chinese mitten crab (*Eriocheir sinensis*), a catadromous species that was first noted in Lake Erie but has not established a permanent population in the Great Lakes, was recently found multiple times along the St. Lawrence River (de Lafontaine et al. 2008). These sightings have raised major concern because the mitten crab may be able to establish stable populations in the St. Lawrence River by gaining access to the brackish or salt waters of the estuary for reproduction (de Lafontaine et al. 2008). If established, the crab can cause structural damage to shorelines owing to their burrowing activities; it can also impact commercial fisheries by damaging fishing nets and eating fish bait (de Lafontaine et al. 2008). At least 17 high risk aquatic NIS, many of which originate from the Ponto-Caspian region, have been identified as potential future invaders in the Great Lakes (Ricciardi and Rasmussen 1998); one of these predicted species, *Hemimysis anomala* (mysid shrimp), was reported from Lake Michigan and Lake Ontario in 2006 (Pothoven et al. 2007). Although these very destructive NIS are not representative of all NIS, the large impacts caused by a small proportion of aquatic NIS validate the need for comprehensive prevention and control programs (Ricciardi and Kipp 2008).

## SPECIFIC ISSUES OF CONCERN TO THE GLSLR REGION

### BALLAST-MEDIATED INVASIONS *VIA* DOMESTIC SHIPPING ACTIVITIES

Domestic shipping operations account for 90% of ship traffic in the GLSLR (Rup et al. 2010). This includes both Canadian and American vessels since the Great Lakes region is a binational waterway and both are considered domestic. Domestic vessels can be classified as 'Lakers', which operate exclusively within the GLSLR, or 'coastal domestic vessels' which operate between ports in the GLSLR and coastal ports within Canada's Exclusive Economic Zone. Ships that operate in the French waters of St. Pierre and Miquelon when outside of Canadian waters will also be considered here as 'coastal domestic vessels' because, like other domestic vessels, they are exempt from ballast water regulations.

Nine species native to rivers of the North American east coast or the St. Lawrence River have established in the Great Lakes, four of which are believed to have been introduced by ballast transfer (de Lafontaine and Costan 2002; Ricciardi 2006). Additionally, at least 13 NIS which first established in the St. Lawrence River have since invaded the Great Lakes (de Lafontaine and Costan 2002). Although there are many plausible pathways for these events, the movement of ballast water by domestic vessels may be an important mechanism (de Lafontaine and Costan 2002; Ricciardi 2006). As such, the risk posed by unregulated domestic ballast exchange must be examined. Here, we assess Lakers and coastal domestic vessels separately because they have unique characteristics that will influence risk.

### Lakers

Lakers are responsible for 95% of ballast water discharges in the GLSLR, equivalent to 68 million tonnes of ballast water being moved between, and within, the region annually (Rup et al. 2010). Ballast water originating from the St. Lawrence River could transport new NIS to the Great Lakes proper, if species native to the River are not native to the Lakes. Less than 1% of Laker movements transfer ballast water from the St. Lawrence River to the Great Lakes, but this represents a significant volume – nearly equivalent to the total ballast entering the system annually from transoceanic and coastal domestic vessels combined (Rup et al. 2010). As such, Lakers may be an important vector for the introduction of aquatic NIS to the Great Lakes. Of even greater concern, however, is the potential for secondary transport of aquatic NIS within the GLSLR (Rup et al. 2010). Lakers could facilitate rapid, widespread distribution of NIS introduced at any one port within the region (by any vector) (Niimi 2004; Ricciardi 2006; Rup et al. 2010). NIS propagules released by Lakers are likely to be in healthier condition than organisms transported by transoceanic vessels because of shorter voyage duration, leading to higher survival rate (Lavoie et al. 1999).

### Coastal domestic vessels

Coastal vessels are a primary concern for introductions to the GLSLR because short domestic voyages, such as those between Canada's East coast and the Great Lakes, are expected to transfer more healthy organisms than would likely be transferred by long foreign voyages (Lavoie et al. 1999). Similar to Lakers, coastal domestic ballast water could act as a source of new NIS to the GLSLR region if species native to coastal ports are not native to the GLSLR. Coastal domestic voyages could also facilitate 'stepping stone' transfers, or secondary spread of NIS initially introduced to coastal ports (by any vector).

## HULL FOULING

Hull fouling has historically received little attention in the Great Lakes, since less than 3% of established aquatic NIS are believed to have been introduced *via* this pathway (Mills et al. 1993). In 2008, use of the highly effective tributyl tin-based anti-fouling paint was banned by international Convention, which may result in a subsequent increase in fouling organisms transported by vessels. Hull fouling is known to be an important vector for the transfer of marine and coastal aquatic NIS (Carlton 1985; Gollasch 2002; Coutts 2003), but until recently its importance in freshwater environments was unknown. Drake and Lodge (2007) raised concern about the potential for hull fouling as an invasion vector to the Great Lakes, but a comprehensive study has since suggested that hull fouling is relatively unimportant for primary introductions of aquatic NIS to the Great Lakes (Sylvester and MacIsaac 2010). The low invasion risk is likely due to the fact that vessels must pass through high salinity marine water *en route* to the Great Lakes, which will likely kill nonindigenous freshwater taxa that could survive in Great Lakes' habitat. Coastal and marine taxa are more likely to survive transoceanic passage, and as such, hull fouling introductions are likely higher risk for marine and brackish-water ports in the St. Lawrence River. Hull fouling could, however, be an important vector for the secondary spread of established freshwater aquatic NIS within the Great Lakes *via* Lakers and coastal domestic vessels. Canada does not currently have domestic hull fouling regulations, although it has supported the adoption of international guidelines for control and management of ships' biofouling.

# METHODS

## STUDY AREA

We defined the study area, hereafter referred to as the 'Great Lakes – St. Lawrence River' (GLSLR) region, to all freshwater ports in the five Great Lakes: Lake Superior, Lake Michigan, Lake Huron, Lake Erie, and Lake Ontario, and the St. Lawrence River, up to and including Québec City (Québec )(El-Sabh and Murty 1990) (Figure 2). The remaining marine part of the St. Lawrence River – the Upper Estuary, Lower Estuary, and Gulf of the St. Lawrence – will be considered in the East Coast risk assessment.

## DETERMINING HULL FOULING-MEDIATED INVASION RISK

The relative risk posed by a NIS is the product of the probability of introduction and the consequences of introduction. The risk assessment for hull fouling-mediated introductions used a three-step process, following the methods of Orr (2003) and the National Code on Introductions and Transfers of Aquatic Organisms (DFO 2009; Figure 3). First, the probability of introduction was estimated by combining the individual probabilities of successful transition through each stage of the invasion process (i.e., arrival, survival and establishment), based on ship arrival data and environmental conditions at GLSLR ports. Second, the potential magnitude of consequences of introduction was estimated based on the number of high impact hull fouling-mediated NIS recorded for eco-regions of ports directly connected to GLSLR ports through ship traffic. Finally, the probability of introduction and potential magnitude of consequences were combined for a final relative invasion risk rating. To ensure that uncertainty is characterized in a standardized way for each component of the assessment, we assigned levels of uncertainty, ranging from very high to very low, based on the quality of data available for analysis (Table 1).

### Step 1A: Estimating Probability of Arrival (Hull Fouling)

A comprehensive database of annual merchant vessel arrivals was assembled for the GLSLR region, for each of the three shipping pathways defined in Table 2. Data for the 90 Lakers operating during 2005-2007 was obtained as annual averages from Rup et al. (2010), which originally referenced the Canadian Coast Guard's Information System on Marine Navigation (INNAV) and the US National Ballast Information Clearinghouse (NBIC). We excluded arrivals to saline ports on the St. Lawrence River (i.e., all ports east of Québec City) recorded by Rup et al. (2010) because these ports were beyond the geographic scope of the current study. Data for coastal domestic and international merchant vessel transits in the five Great Lakes and the St. Lawrence River (west of, and including, Valleyfield, Québec), between 2005 and 2007, were obtained as annual averages from INNAV and the US Coast Guard's National Vessel Movement Centre (NVMC)(M. Minton, National Ballast Information Clearinghouse, unpublished data).

Transit data for coastal domestic and international merchant vessel arrivals to ports east of Valleyfield, up to and including Québec City in 2006, were obtained from INNAV. Canada requires all commercial vessels to report to INNAV when entering each Canadian Maritime Communications and Traffic Services Zone, while voluntary reporting typically occurs within each zone for emergency safety reasons. Information reported to INNAV includes arrival and departure events, and cargo and ballast operations at ports. We limited our analysis of raw shipping data to arrivals in a 12-month period because of the large volume of data and time constraints. We used shipping data from 1 January 2006 to 31 December 2006 because data from 2006 were the only complete data available to us in 2009 when the study was initiated. We include only merchant vessels in this risk assessment since information on non-merchant vessels was not included in all data sources. Some ports in the GLSLR (e.g., Duluth (Minnesota) and Superior (Wisconsin)) were combined due to reporting differences among data sources and close physical proximity following Rup et al. 2010.

We used the number of vessel arrivals as a proxy for propagule pressure and colonization pressure (i.e., the number of species) of fouling NIS potentially arriving at ports, and hereafter use the term 'propagule supply' to describe a joint measure of propagule and colonization pressure. We recognize that the number of vessel arrivals is a coarse proxy for propagule supply as the actual number of NIS individuals and species arriving to the recipient environment have not been quantified. Sailing speed, port layover time, anti-fouling management, and voyage history can all affect the propagule supply associated with hull fouling of individual ships (Minchin and Gollasch 2003; Coutts and Taylor 2004; Sylvester and MacIsaac 2010), but due to data limitations these factors could not be incorporated here.

A ranking system was used to convert the number of vessel arrivals into a relative probability of arrival, where the maximum number of annual arrivals to a single port was divided into five equal categories (Table 3). The choice of five equal categories assumes a positive linear relationship between the two variables, which is consistent with general invasion theory; however, because the number of arrivals is a very coarse proxy for the actual propagule supply received by hull fouling, the associated uncertainty is moderate. Due to the large number of ports in the region and limited time and resources available to complete the risk assessment, we arbitrarily prioritized the top three ports in each vessel category, based on the probability of arrival, for further assessment. It was noted during the peer review that ports ranked below the top three sometimes had values only marginally lower than those ports selected for full assessment; given additional resources in the future, analyses of additional ports below the top three (in all vessel categories) may be of interest.

### Step 1B: Estimating Probability of Survival (Hull Fouling)

After being released into a new environment, introduced propagules must survive in the recipient environment in order for an invasion to occur. Species-specific risk assessments typically estimate probability of survival by comparing environmental conditions of native and recipient ranges using data-intensive environmental niche models (e.g. Therriault and Herborg 2007; Therriault et al. 2008a, b). Vector-based risk assessments, involving hundreds to thousands of species, each with individual habitat requirements, prohibit the use of such complex models. While coarse comparison of environmental similarity between source and recipient regions is manageable, the case of hull fouling is further complicated by the potentially long history of species accumulation at a variety of ports. Species encrusted on vessels can represent a menagerie of sources, with the most recent port-of-call contributing perhaps only a very small fraction of the total fouling community (Fofonoff et al. 2003; Mineur et al. 2007). Source-recipient port comparisons would require data on all ports visited since the vessel was last cleaned in drydock, as well the mooring duration at each port and application of any fouling management practices. Since our dataset included only information on the last port-of-call, we could only assign probabilities of survival at a very coarse level. While hull fouling is documented as an important vector of NIS to coastal marine habitats, the risk for fouling by transoceanic vessels appears much lower for freshwater habitats (Sylvester and MacIsaac 2010); therefore, recipient ports which are exclusively freshwater (salinity <2 parts per thousand) were assigned the lowest probability of survival for fouling by the international and coastal shipping categories while all other ports were categorized as highest probability of survival. This estimate carries a moderate level of uncertainty since salinity can vary both spatially and temporally with a single port. For Laker vessels, the probability of survival was categorized as highest since these vessels operate exclusively within a single habitat type – while there are few freshwater fouling organisms in the GLSLR able to attach to Laker hulls, any which do so would be expected to survive environmental conditions at subsequent GLSLR ports.

## Step 1C: Calculating Probability of Introduction (Hull Fouling)

The probabilities of arrival and survival were calculated as separate, independent events. However, because the overall probability of introduction is dependent on the sequential occurrence of arrival and survival, a minimum probability approach was used to determine the overall probability that all stages are passed successfully (Orr 2003; DFO 2009). For example, given a very low probability of arrival and a very high probability of survival, the overall probability of introduction would be very low, because high survival probabilities are offset by a very low number of arriving individuals made available to survive. Due to the very large number of potential hull-fouling species, we were unable to estimate the probability that a reproductive population of any one NIS could establish at a recipient GLSLR port or become widespread within Canada (but see section 3.5 on ship-mediated secondary spread). Excluding these two stages of invasion from the analysis essentially sets their probabilities at the highest level since the minimum probability approach retains the value of the component with the lowest rating. The minimum probability approach is widely used in qualitative risk assessments (e.g., Canadian Food Inspection Agency Weed Risk Assessment Guidelines, Aquatic Nuisance Species Task Force, and Commission for Environmental Cooperation Risk Assessment Guidelines) and produces risk ratings most consistent with quantitative risk approaches (Koops and Cudmore 2009). In contrast, we retained the highest level of uncertainty for any one stage of invasion as the uncertainty associated with the probability of introduction.

## Step 2: Estimating the Magnitude of Consequences (Hull Fouling)

Predicting potential impacts of NIS involves evaluating the physical-chemical requirements of the NIS and their interactions with native species at recipient sites; a species-specific estimate for potential impact (Colautti and MacIsaac 2004; Lockwood et al. 2006). Again, predicting potential impact for a vector-based risk assessment is complicated by the wide range of possible NIS associated with the vector. Since up-to-date, port-specific lists of native species and established NIS are not available for most ports, we compiled a list of high impact fouling NIS for connected source ports using data from the Nature Conservancy's Marine Invasive Database (Molnar et al. 2008; available at http://conserveonline. org/ workspaces/ global.invasive.assessment). High-impact NIS are defined as introduced species that disrupt multiple species, ecosystem function, and/or keystone or threatened species. The database includes 81 high impact fouling NIS in 232 coastal ecoregions; we created an inland GLSLR ecoregion by applying the same criteria as Molnar et al. (2008) against the 182 established NIS listed in the Great Lakes Aquatic Nonindigenous Species Information System (available at http://www.glerl.noaa.gov/res/Programs/ glansis/glansis.html). We then tabulated the number of high impact fouling NIS recorded for the ecoregion of each source port directly connected to each top GLSLR port, assuming that each connected port may be a donor of all high impact fouling NIS established within the ecoregion; therefore, multiple tally counts are given to a single NIS that could originate from multiple source ports.

A ranking system was used to convert the cumulative number of high impact NIS connected to each top GLSLR port into a relative magnitude of consequences, where the maximum value was divided into five equal categories (Table 4). Again, the choice of five equal categories assumes a positive linear correlation, consistent with general theory to date. Because the list of high impact species was available for ecoregions rather than specific ports, does not account for species that may cause high impacts in new recipient regions despite low or negligible impact in source regions, and does not account for high impact species that are native to the source region, the level of uncertainty associated with magnitude of consequences was considered moderate.

### Step 3: Calculating the Final Invasion Risk (Hull Fouling)

The probability of introduction (Step 1) and magnitude of consequences (Step 2) of hull fouling-mediated NIS were combined into a final relative invasion risk based on a symmetrical mixed-rounding matrix that reduces the final ratings to three levels (modified from Therriault and Herborg 2007; Table 5). The colouring of this matrix was determined by consensus at the peer review meeting to be the most balanced approach for assigning levels of risk; however, the matrix can easily be changed to accommodate differing risk tolerance levels by risk managers and/or stakeholders. The highest level of uncertainty assigned to either probability of introduction or magnitude of consequences was retained as the uncertainty associated with the final invasion risk.

## ESTIMATING SHIP-MEDIATED SECONDARY SPREAD (HULL FOULING)

The dataset assembled to estimate the probability of arrival provided opportunity to estimate the potential for secondary spread of fouling NIS from top GLSLR ports to other Canadian ports by fouling of domestic ships. Recognizing that NIS introduced via hull fouling may spread by a variety of natural and anthropogenic vectors other than hull fouling, for which we have no information, this measure of secondary spread was not incorporated into the probability of introduction. Further, it was not clear if spread should be included in a vector-based risk assessment as a component of the probability of introduction or the magnitude of consequences, since the extent of secondary spread can influence the magnitude of impact. However, we include the information here as a valuable resource that could be used to direct hull fouling management activities.

Assuming that each vessel arriving to a GLSLR port would subsequently depart to a next port-of-call, the number of coastal domestic and Laker arrivals at each top port was used as a surrogate measure for the number of coastal domestic and Laker departures from GLSLR top ports. A ranking system was used to convert the data into a relative probability of spread, where the maximum value was divided into five equal categories (Table 6). Again, the choice of five equal categories assumes a positive linear correlation, consistent with general theory to date. The level of uncertainty is considered moderate for the same reasons described for probability of arrival for hull fouling.

## DETERMINING BALLAST-MEDIATED INVASION RISK

A three step process, similar to that outlined above for hull fouling, was utilized to determine the relative level of invasion risk posed by ballast water (Figure 4). First, the probability of introduction was estimated by combining the individual probabilities of successful transition through each stage of the invasion process (i.e., arrival and survival), based on ballast water discharge data and environmental similarity between source and recipient ports. Second, the potential magnitude of consequences of introduction was estimated based on the number of high impact ballast-mediated NIS recorded for eco-regions of source ports. Finally, the probability of introduction and potential magnitude of consequences were combined for a final invasion risk rating. To ensure that uncertainty is characterized in a standardized way for each component of the assessment, we assigned levels of uncertainty, ranging from very high to very low, based on the quality of data available for analysis (Table 1). We recognize that residual sediments in ballast tanks may increase the propagule supply associated with ballast water discharge by commercial vessels (Bailey et al. 2007); however, we did not have adequate data to evaluate this vector for this study.

### Step 1A: Estimating Probability of Arrival (Ballast Water)

Ballast water information for merchant vessels that arrived at all GLSLR ports during the study period was obtained from Rup et al. (2010), NBIC, and Transport Canada's Ballast Water Database (TCBWD). Summarized ballast information for Lakers was obtained from Rup et al. (2010), which originally referenced INNAV and NBIC, and included ports within the same geographic boundary as described for vessel arrivals (see above). Similar to the hull fouling analysis above, we excluded ballast water discharged at ports east of Québec City as these ports were beyond the geographic scope of this study. Ballast information for coastal domestic and international vessels that arrived at freshwater ports in the five Great Lakes and freshwater ports in the St. Lawrence River (from Duluth-Superior (Minnesota-Wisconsin) to Valleyfield (Québec)) during 1 January 2007 to 31 December 2007 were obtained from NBIC, TCBWD, NVMC, and INNAV (M. Minton, NBIC, unpublished data).

Ballast information for coastal domestic and international merchant vessels at remaining freshwater ports between Valleyfield and Québec City was obtained for 2006 from TCBWD. All vessels with a ballast capacity greater than eight $m^3$ are required to file ballast water reports prior to the first port-of-call in Canadian waters. These reports contain information on the ballast history for each vessel transit, ballast tank capacities and management activities. Only merchant vessels were considered for ballast water assessment because other vessel types carry very little or no ballast water and do not consistently report ballast activities to Canadian or American authorities. We cross-referenced ballast water activities reported to the TCBWD with cargo activities reported to INNAV. Cargo and ballast information is typically reported to INNAV in binary format (load or unload; volumes are not reported), and all reports are date and time coded.

Because vessels operating within Canadian waters are not required to report ballast activities to Transport Canada, ballast information had to be reconstructed from INNAV data for coastal domestic transits. Following the method of Rup et al. (2010), we assumed that ballast water was discharged when cargo was loaded for 594 transits. We assigned discharge volumes based on either the deadweight tonnage of these ships with a correction factor of 0.5 for merchant bulks, tankers and chemicals or 0.3 for merchant generals, merchant containers, and roll-on/roll-off vessels based on correlations between cargo weight and ballast water volume (C.J. Wiley, Transport Canada, Sarnia, Ontario, personal communication, 2010), or the discharge volume of sister ships in the same vessel class size (see Rup et al. 2010). All ballast water transported by coastal domestic and Laker vessels was assumed to be unmanaged, hereafter referred to as "direct" water, since domestic transits are exempt from ballast water management regulations. The last port-of-call was assumed to be the ballast source for all coastal domestic and Laker discharges, unless voluntary reports to the TCBWD were available. We found 30 incomplete reports to the TCBWD with missing discharge volume and exchange status; we assigned discharge volumes to these transits based on information obtained within each report, such as the volume onboard, exchanged volume, and source volume. For ease of summary, the geographic location of ballast water sources was condensed into regions, including the Arctic, North-west Atlantic, North-east Atlantic, Western-central Atlantic, Eastern-central Atlantic, South-east Atlantic, and Mediterranean and Black Sea, as described by the Food and Agriculture Organization (FAO 2009; Figure 5) and as used in past ballast water studies (e.g., Amoako-Atta and Hicks 2004; Simard and Hardy 2004; Claudi and Ravishankar 2006).

The volume of foreign ballast water discharged by international vessels was corrected to account for reduction in propagule supply due to mandatory management activities[1]. This correction was also applied to ballast water discharged by coastal domestic vessels that reported conducting voluntary ballast water exchange to Transport Canada. Ballast water exchange can reduce propagule supply by flushing out most entrained organisms and killing those that remain *via* osmotic stress associated with rapid salinity change (Wonham et al. 2001; Ruiz and Smith 2005). However, some viable NIS propagules entrained at the source port may remain viable in tanks despite full compliance by ships (Wonham et al. 2001; Levings and Foreman 2004; Ruiz and Smith 2005). A correction factor of 0.1 for ships with ballast water from saline ports, or 0.01 for freshwater ports, was applied to the reported volumes of exchanged ballast water to estimate propagule supply. These values were derived from ballast water exchange efficacy rates, as determined by total zooplankton abundance, reported for saline water (90%) and freshwater (99%) ports, respectively (Ruiz and Smith 2005; Gray et al. 2007). Ballast water discharged by international and coastal domestic merchant vessels and Lakers was evaluated separately because vessels in different operational regions will likely carry different species assemblages with different characteristics and requirements affecting invasion risk. The volume of ballast water discharged at each port in the database is a sum of the three-year average reported by Rup et al. (2010), the single-year ballast information from NBIC-NVMC (M. Minton, NBIC, unpublished data) and the single-year data from TCBWD-INNAV.

We used the corrected volume of ballast water discharged as a proxy for the propagule supply of NIS potentially arriving at ports by ballast water. Ballast volume acts like a scaling coefficient, where large volumes are more likely to transport larger propagule pressure, but can also transport low propagule pressure. While propagule pressure associated with the ballast water of any single vessel is expected to be more directly related to physico-chemical and/or geographic-seasonal factors like water salinity, age of ballast water and management practices than total volume (Aguirre-Macedo et al. 2008; Burkholder et al. 2007; McCollin et al. 2008; Villac and Kaczmarska 2011), the available dataset did not include these data. While imperfect, the use of volume is consistent with previous studies (Drake and Lodge 2004; Herborg et al. 2007; Simkanin et al. 2009).

A ranking system was used to convert the volume of ballast water discharged into a relative probability of arrival, where the maximum mean annual corrected volume of ballast water discharged at a single GLSLR port was divided into five equal categories (Table 7). The choice of five equal categories assumes a positive linear relationship between the two variables, which is consistent with general invasion theory; recognizing that the volume of ballast water discharged is a robust but not a direct measurement of the propagule supply within the water, the associated uncertainty level was set as low. Due to the large number of ports in the region and limited time and resources available to complete the risk assessment, we arbitrarily prioritized the top three ports in each vessel category, based on the probability of arrival, for full assessment.

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[1] The dataset originally compiled for this study indicated that ~7% of foreign ballast water discharged at GLSLR ports in 2006 may have been directly discharged without exchange. The peer review group decided that using the original dataset would result in an overestimation of current (2011) invasion risk due to the intensive inspection regime initiated in the GLSLR region by 2007. As a result, the numbers have been adjusted to reflect current risk, assuming 100% compliance with regulations by all international vessels.

### Step 1B: Estimating Probability of Survival (Ballast Water)

Following the reasoning outlined in section 3.2, Step 1B, we conduct a comparison of the environmental similarity between source and recipient ports of ballast water to estimate the probability of survival. Environmental similarity analysis between NIS source and recipient ports is common in ballast water risk assessments (see Hilliard et al. 1997; Gollasch and Leppäkoski 1999; Hayes and Hewitt 2001; Mills and Thomas 2006; Herborg et al. 2007; Keller et al. 2010). The main advantage of this approach is that it rapidly assesses the likelihood of NIS survival post-arrival based on the environmental conditions of the source and recipient sites (Barry et al. 2008). All ports directly connected to each top GLSLR port as a source of ballast water were noted, allowing identification of source-recipient port-pairs. Following methodology of Keller et al. (2010) we selected four parameters to estimate environmental similarity between port-pairs, including annual average water temperature, mean water temperature during the warmest month, mean water temperature during the coldest month and annual average salinity. We recognize that additional variables such as pH, dissolved oxygen, tidal range, rainfall, day length and ice cover can influence species survival potential at the recipient environment. However, we focused our analysis on temperature and salinity because they are fundamental physical factors for survival and reproduction of aquatic organisms (Kinne 1963; Anger 1991; Browne and Wanigasekera 2000; Verween et al. 2007). In addition, including variables that are not related to invasion risk for some or all potential NIS can dramatically influence the sensitivity of the environmental similarity measure (Barry et al. 2008).

Following Keller et al. (2010), environmental similarity between top ports and global ports was calculated using Euclidean distance in four-dimensional space. Euclidean distance was used because it is a simple method to measure linear distance and is commonly used to measure environmental similarity between two locations (Barry et al. 2008). Sensitivity analysis revealed that salinity was the most influential variable in this calculation, and thus had approximately equal overall weight in the outcome as the three temperature parameters (Keller et al. 2010). We obtained data for the four environmental parameters for 6,651 global ports from Keller et al. (2010). In addition, we interpolated data for these four environmental parameters in ArcGIS 10 (ESRI Inc.) for 56 Arctic ports not included in Keller et al. (2010) using data from the World Ocean Atlas (Antonov et al. 2006; Locarnini et al. 2006). All environmental values were standardized using a z-transformation so that each variable had equal weight in the calculation. Euclidean distance values between each top port and all connected source ports were averaged to obtain a final rating for survival potential.

A ranking system was used to convert the average Euclidean distance value for each port into a relative probability of survival, where the maximum value for any single source-recipient port-pair (of all possible global port-pairs, not just those that were identified as connected in this dataset) was divided into five equal categories (Table 8). Again, the choice of five equal categories assumes a positive linear correlation, consistent with general theory to date. This estimate carries a moderate level of uncertainty since spatial and temporal variation in salinity at a single port are likely not well represented by the annual average salinity.

Further, we recognized that biological interactions may also enhance or impede NIS survival at the recipient port (Colautti and MacIsaac 2004) but we were unable to assess these interactions due to the large number of species potentially associated with the ballast water vector.

### Step 1C: Calculating Probability of Introduction (Ballast Water)

As described above for hull fouling, probabilities of arrival and survival were combined into a probability of introduction using the minimum probability method, while retaining the highest level of uncertainty. Probabilities of establishment and spread were not included in this risk assessment, but information about potential for ship-mediated secondary spread is provided below.

In addition, to identify potentially important source ports of ballast-mediated NIS, we overlaid propagule supply and environmental similarity measures between all connecting port-pairs ArcGIS 10. Port-pairs in the upper two categories for both components were considered most likely sources of NIS due to sufficient propagule supply and environmental matching (Orr 2003).

### Step 2: Estimating the Magnitude of Consequences (Ballast Water)

Similar to the methodology described above for hull fouling, we compiled a list of high impact ballast-mediated NIS for connected source ports using the Nature Conservancy's Marine Invasive Database (Molnar et al. 2008). The database includes a total of 90 high impact ballast-mediated NIS in 232 ecoregions. We first tabulated the number of high impact ballast-mediated NIS recorded for the ecoregion of each source port directly connected to each top GLSLR port, assuming that each connected port may be a donor of all high impact ballast-mediated NIS established within the ecoregion; therefore, multiple tally counts are given to a single NIS that could originate from multiple source ports.

A ranking system was used to convert the cumulative number of high impact NIS connected to each top GLSLR port into a relative magnitude of consequences, where the maximum value was divided into five equal categories (Table 9). Again, the choice of five equal categories assumes a positive linear correlation, consistent with general theory to date. Because the list of high impact species was available for ecoregions rather than specific ports, does not account for species that may cause high impacts in new recipient regions despite low or negligible impact in source regions, and does not account for high impact species that are native to the source region, the level of uncertainty associated with magnitude of consequences was considered moderate.

### Step 3: Calculating Final Invasion Risk (Ballast Water)

The probability of introduction (Step 1) and magnitude of consequences (Step 2) of ballast-mediated NIS were combined into a final relative invasion risk based on a symmetrical mixed-rounding matrix, as described above for hull fouling (Table 5). The highest level of uncertainty assigned to either probability of introduction or magnitude of consequences was retained as the uncertainty associated with the final invasion risk.

## ESTIMATING SHIP-MEDIATED SECONDARY SPREAD (BALLAST WATER)

As described in Section 3.3 above, the assembled dataset provided opportunity to estimate the potential for secondary spread of ballast-mediated NIS from top GLSLR ports to other Canadian ports by domestic ships, but was not considered comprehensive enough to include as a probability of spread in the risk assessment. We were unable to estimate the volume of ballast water being transferred among ports since coastal domestic and Laker vessels are not required to submit ballast water report forms, and we could not reasonably assign a given volume of ballast loaded per ship due to the multi-port, variable cargo activities of domestic vessels in the GLSLR. Instead, we assessed only the number of ballast water uptake events, assuming that all vessels that discharged cargo subsequently loaded ballast water before departing for the next domestic port-of-call. Essentially, the number of ballast water uptakes at each top GLSLR port was calculated by subtracting the number of ballast water discharge events from the number of arrivals, for all coastal domestic and Laker vessels. A ranking system was used to convert the data into a relative probability of spread, where the maximum value was divided into five equal categories (Table 10). Again, the choice of five equal categories assumes a positive linear correlation, consistent with general theory to date. The level of uncertainty is considered moderate for the same reasons described for probability of arrival for ballast water.

# RESULTS AND DISCUSSION

## VESSEL ARRIVALS IN THE GLSLR REGION

A total of 12,928 distinct merchant vessel arrivals were recorded during a 12-month period at 117 active GLSLR ports based on the combined data from INNAV, Minton et al. (in preparation) and Rup et al. (2010). Lakers contributed the greatest number of vessel arrivals (n = 9,175), followed by international merchant vessels (n = 2,785) and coastal domestic merchant vessels (n = 968). Vessel arrivals were evenly distributed in the region with the exception of Lake Superior where fewer ship visitations were noted (Figure 6).

### Probability of Arrival (Hull Fouling)

#### International Merchant Vessels

We identified 2,785 distinct international merchant vessel arrivals at 43 GLSLR ports during the study period. Montréal (Québec), Québec City (Québec) and Sorel-Tracy (Québec) were the top three ports receiving the greatest number of international merchant vessel arrivals with Montréal having the highest probability for arrival of hull-mediated NIS (Table 11). Arrival probabilities for the remaining GLSLR ports ranged from lowest to intermediate. Port locations are shown in Figure 7.

Our results suggest that Montréal has the highest probability for arrival of foreign fouling NIS propagules. However, many of these propagules may not be able to survive transit as they are typically exposed to long voyages, with potentially high traveling speeds, in a wide range of temperatures and salinities which can decrease survival and invasion risk (Coutts 2003; Coutts and Taylor 2004). Further, species that do survive transoceanic transits are less likely to survive in the freshwater environment of the GLSLR region. A comprehensive hull fouling study in the Great Lakes found that hull fouling from international vessels poses a low introduction risk for new NIS capable of surviving in the region (Sylvester and MacIsaac 2010). Therefore, the actual number of viable propagules arriving at the recipient port may be low. However, there are fouling organisms (e.g., bryozoans and isopods) capable of tolerating a wide range of salinities (0 – 37 ppt) and temperatures (9.9 – 31.6 °C; Davidson et al. 2008), thus the potential for successful hull-mediated NIS introductions across regions cannot completely be disregarded (Lewis et al. 2006).

### Coastal Domestic Merchant Vessels

We identified 968 distinct coastal domestic merchant vessel arrivals at 41 GLSLR ports during the study period. Montréal, Québec City and Sorel-Tracy were the top three ports receiving the greatest number of coastal domestic merchant vessel arrivals (Table 12), although all GLSLR ports ranged from lowest to lower potential for arrival of hull-mediated NIS. Port locations are shown in Figure 7.

Coastal domestic merchant vessels have shorter voyage times and travel within similar latitudes compared to international merchant vessels and therefore are more likely to transport viable fouling organisms to GLSLR ports. However, fouling organisms on coastal domestic vessels traveling to GLSLR ports will experience variation in temperature and salinity during the voyage, and therefore only fouling organisms able to tolerate such variation have the potential to remain viable once delivered to the destination port.

### Lakers

A total of 9,175 distinct Laker arrivals were reported at 112 GLSLR ports during the study period. Duluth-Superior (Minnesota-Wisconsin), Detroit-Ecorse (Michigan) and Cleveland (Ohio) were the top three ports receiving the greatest number of Laker arrivals with Duluth-Superior as the only port with a higher probability for arrival of hull-mediated NIS (Table 13). Arrival probabilities for the remaining ports ranged from lowest (not shown in Table 13) to intermediate. Port locations are shown in Figure 7.

Viable fouling organisms are more likely to be transported to GLSLR ports by Lakers compared to international and coastal domestic merchant vessels because Lakers generally travel shorter distances within similar latitudes and therefore expose fouling organisms to less variation in temperature and salinity (Coutts and Taylor 2004). Given the region of operation, Lakers would be expected to contribute only to the spread of native nuisance species and established NIS (Carlton and Hodder 1995; Lavoie et al. 1999).

## Probability of Survival (Hull Fouling)

All of the top ports considered in this risk assessment have annual average salinities <2 parts per thousand and are considered freshwater ports. Survival probabilities for hull fouling-mediated NIS *via* international and coastal domestic vessels were therefore defined as lowest since these vessels transit through high salinity waters before entering and arriving at Great Lakes ports (Table 14). Since Laker vessels transit exclusively between freshwater ports in the GLSLR, survival of (freshwater) taxa potentially transported by Lakers was assigned highest probability.

## Probability of Introduction (Hull Fouling)

Duluth-Superior has a higher probability for introduction of hull fouling-mediated NIS *via* Laker traffic (Table 14). Probability of introduction for the remaining top ports in each vessel category ranged from lowest to intermediate, thus hull fouling-mediated NIS introduction is less likely at these ports.

## Magnitude of Consequences (Hull Fouling)

The cumulative number of high impact fouling NIS at each top port by vessel category ranged from 35 to 1,433 representing 88 distinct NIS (Table 15; Appendix H). Montréal was rated highest for magnitude of potential consequences of NIS *via* international merchant vessels, with a cumulative number of 1,433 high impact fouling NIS representing 73 distinct NIS. Québec City was rated higher for magnitude of potential consequences *via* international merchant vessels, with a cumulative number of 975 high impact fouling NIS representing 75 distinct NIS. The remaining GLSLR top ports were rated lowest to intermediate for magnitude of potential consequences of fouling NIS.

## Final Invasion Risk (Hull Fouling)

No top GLSLR port received a higher risk for hull fouling-mediated invasions (Table 16). Three top ports have an intermediate risk for invasion, including Montréal, Québec City and Duluth-Superior. The invasion risk for the 6 remaining top ports was lower.

## SECONDARY SPREAD BY HULL FOULING

Duluth-Superior has the highest potential to act as a source for hull fouling-mediated spread of NIS within Canada (Table 17). Duluth-Superior is a top port for Laker arrivals. Detroit-Ecorse is also a top port for Laker arrivals and has a higher potential for hull fouling-mediated NIS spread. Fouling NIS introduced to these ports have the greatest probability of spreading to other Canadian ports by domestic transport pathways. As a result, these top ports may serve as hubs for stepping stone invasions if fouling NIS successfully establish at these sites. The probability of spread for the remaining top ports ranged from lowest to intermediate and therefore may play a less prominent role in the spread of fouling NIS within Canada.

## BALLAST WATER DISCHARGES IN THE GLSLR REGION

During the study period, merchant vessels conducted 5,683 ballast water discharges, releasing approximately 73,573,813 $m^3$ of ballast water at 84 GLSLR ports (Table 18). After correcting for the reduction in propagule supply as a result of ballast water exchange, the volume discharged was 72,342,194 $m^3$, indicating that the majority of ballast water discharged in the GLSLR originates from Canadian ports. Approximately 94% of the corrected total volume originated from Canadian and U.S. ports in the GLSLR, while 4% originated from Canadian coastal ports and the remaining 2% originated from foreign ports in various FAO regions (Table 19). Ports in the GLSLR and North-west Atlantic were the greatest contributor of direct ballast water to the GLSLR region because Lakers and coastal domestic vessels travelling within Canadian waters and the U.S. exemption zone are exempt from ballast water management.

Ballast water discharges were evenly distributed in the GLSLR region, with the exception of Lake Superior where fewer discharge events occurred. However, ports in Lake Superior received relatively greater volumes of total ballast water and direct ballast water during the study period (Figure 8).

## Probability of Arrival (Ballast Water)

### International Merchant Vessels

During the study period, international merchant vessels discharged a total of 4,890,414 $m^3$ of ballast water at 34 GLSLR ports. The total discharged volume included 3,539,803 $m^3$ of direct domestic water and 1,334,739 $m^3$ of exchanged foreign water to which a correction factor was applied to account for the reduced propagule supply due to mid-ocean exchange (refer to Section 3.4 Step 1A for details). Québec City, Sorel-Tracy (Québec) and Montréal were the top three GLSLR ports receiving the greatest combined volume of domestic direct and exchanged (with correction factor applied) ballast water discharged by international merchant vessels (Table 20), however the probability of arrival of ballast-mediated NIS *via* international merchant vessels was lowest for all top GLSLR ports. Port locations are shown in Figure 9.

Ballast water from international source ports must now be exchanged or flushed on the open ocean, which dramatically reduces potential propagule supply to Canadian ports (Bailey et al. 2011). Therefore, ballast water discharged by international merchant vessels may no longer play a prominent role in introducing NIS from foreign sources.

### Coastal Domestic Merchant Vessels

During the same period, coastal domestic merchant vessels discharged a total of 1,980,604 $m^3$ of ballast water at 22 GLSLR ports. Nearly all ballast water moved by coastal domestic merchant vessels was discharged directly, although voluntary ballast water exchange was reported for 7,429 $m^3$. Québec City, Montréal and Toronto (Ontario) were the top three GLSLR ports receiving the greatest combined volume of ballast water discharged by coastal domestic vessels (Table 21). The probability of arrival of ballast-mediated NIS *via* coastal domestic merchant vessel discharges was lowest for all top GLSLR ports. Port locations are shown in Figure 9.

Ballast water discharged by coastal domestic vessels may have a higher propagule supply compared to international vessels due to the inverse relationship between duration of voyage and propagule survival – plankton are more likely to survive the environmental conditions and resist predation and competition inside a ballast tank over a shorter period of time (Lavoie et al. 1999; Verling et al. 2005; Simkanin et al. 2009). However, coastal domestic vessels likely play a more prominent role in the spread of native nuisance species and/or established NIS, rather than the introduction of new NIS from foreign sources (Carlton and Hodder 1995; Lavoie et al. 1999).

### Lakers

Lakers discharged a total of 66,702,794 $m^3$ ballast water at 80 GLSLR ports. All ballast water moved by Lakers was discharged directly as Lakers are exempt from ballast management regulations and do not transit offshore to a suitable location where exchange can be conducted. Duluth-Superior, Two Harbors (Minnesota) and Presque Isle-Marquette (Michigan) were the top three ports receiving the greatest total volume of direct ballast water from Lakers (Table 22). Duluth-Superior had the highest probability for ballast-mediated NIS arrival *via* Laker vessel discharges while probabilities for the remaining top ports ranged from lowest to lower. Port locations are shown in Figure 9.

Ballast water discharged by Laker vessels may have a higher propagule supply compared to international vessels due to the inverse relationship between duration of voyage and propagule survival – plankton are more likely to survive the environmental conditions and resist predation and competition inside a ballast tank over a shorter period of time (Lavoie et al. 1999; Verling et al. 2005; Simkanin et al. 2009). However, Lakers likely play a more prominent role in the spread of native nuisance species and/or established NIS, rather than the introduction of new NIS from foreign sources (Carlton and Hodder 1995; Lavoie et al. 1999).

## Probability of Survival (Ballast Water)

### International Merchant Vessels

Thirty-three foreign, 17 coastal domestic, and 18 GLSLR ballast water source ports were identified and evaluated for environmental similarity with Québec City (Table 23). The overall probability of survival at Québec City was higher, with 33 source ports having higher or highest environmental similarity to Québec City. However, all connected ports with higher or highest environmental similarity with Québec City also had relatively low propagule supply, making these locations unlikely sources of ballast-mediated NIS to Québec City (Figure 10). A list of global ports with highest environmental similarity to Québec City is provided in Appendix A; NIS originating from these ports would have the highest probability for survival if introduced to Québec City.

Eighteen foreign, 11 coastal domestic and 12 GLSLR ballast water source ports were identified and evaluated for environmental similarity with Sorel-Tracy (Table 24). The overall probability of survival at Sorel-Tracy was higher, with 24 source ports having higher or highest environmental similarity to Sorel-Tracy. However, all connected ports with higher or highest environmental similarity to Sorel-Tracy also had relatively low propagule supply, making these locations unlikely sources of ballast-mediated NIS to Sorel-Tracy (Figure 11). A list of global ports with highest environmental similarity to Sorel-Tracy is provided in Appendix B; NIS originating from these ports would have the highest probability for survival if introduced to Sorel-Tracy.

Forty-four foreign, 10 coastal domestic and 25 GLSLR ballast water source ports were identified and evaluated for environmental similarity with Montréal (Table 25). The overall probability of survival at Montréal was higher, with 41 source ports having higher or highest environmental similarity to Montréal. However, all connected ports with higher or highest environmental similarity with Montréal also had relatively low propagule supply, making these locations unlikely sources of ballast-mediated NIS to Montréal (Figure 12). A list of global ports with highest environmental similarity to Montréal is provided in Appendix C; NIS originating from these ports would have the highest probability for survival if introduced to Montréal.

### Coastal Domestic Merchant Vessels

Eleven coastal domestic and 22 GLSLR ballast water source ports were identified and evaluated for environmental similarity with Québec City (Table 26). The overall probability of survival at Québec City was higher, with 23 source ports having higher or highest environmental similarity to Québec City. However, all connected ports with higher or highest environmental similarity with Québec City also had relatively low propagule supply, making these locations unlikely sources of ballast-mediated NIS to Québec City (Figure 13).

Twelve coastal domestic and 14 GLSLR ports were identified and evaluated for environmental similarity with Montréal (Table 27). The overall probability of survival at Montréal was higher, with 16 source ports having higher or highest environmental similarity to Montréal. However, all connected ports with higher or highest environmental similarity with Montréal also had relatively low propagule supply, making these locations unlikely sources of ballast-mediated NIS to Montréal (Figure 14).

One coastal domestic ballast water source port, Québec City, was identified and evaluated for environmental similarity with Toronto (Table 28). The environmental similarity between Toronto and Québec City indicates highest probability of survival. However, Québec City does not appear to be a likely source for ballast-mediated NIS because of low propagule supply (Figure 15). A list of global ports with highest environmental similarity to Toronto is provided in Appendix D; NIS originating from these ports would have the highest probability for survival if introduced to Toronto.

### Laker Ballast Water Discharge

Fifty-nine GLSLR ballast water source ports were identified and evaluated for environmental similarity with Duluth-Superior (Table 29). The overall probability of survival at Duluth-Superior was highest, with all 59 source ports having higher or highest environmental similarity to Duluth-Superior. Burns Harbor (Indiana), Nanticoke (Ontario) and St. Clair (Michigan) were identified as potential sources of ballast-mediated NIS to Duluth-Superior having both relatively high propagule supply and environmental similarity (Figure 16). The remaining connected ports are unlikely sources of ballast-mediated NIS due to relatively low propagule supply. A list of global with highest environmental similarity to Duluth-Superior is provided in Appendix E; NIS originating from these ports would have the highest probability for survival if introduced to Duluth-Superior.

Thirty-six GLSLR ballast water source ports were identified and evaluated for environmental similarity with Two Harbors (Table 30). The overall probability of survival at Two Harbors was highest, with all 36 source ports having higher or highest environmental similarity to Two Harbors. Gary (Indiana) was identified as a potential source of ballast-mediated NIS to Two Harbors having both relatively high propagule supply and environmental similarity (Figure 17). The remaining connected ports are unlikely sources of ballast-mediated NIS due to relatively low propagule supply. A list of global ports with highest environmental similarity to Two Harbors is provided in Appendix F; NIS originating from these ports would have the highest probability for survival if introduced to Two Harbors.

Forty-three GLSLR ballast water source ports were identified and evaluated for environmental similarity with Presque Isle-Marquette (Table 31). The overall probability of survival at Presque Isle-Marquette was highest, with 42 source ports having highest, and one source port having higher environmental similarity to Presque Isle-Marquette. However, all connected ports with higher or highest environmental similarity with Montréal also had relatively low propagule supply, making these locations unlikely sources of ballast-mediated NIS to Presque Isle-Marquette (Figure 18). A list of global ports having highest environmental similarity to Presque Isle-Marquette is provided in Appendix G; NIS originating from these ports would have the highest probability for survival if introduced to Presque Isle-Marquette.

## Probability of Introduction (Ballast Water)

Duluth-Superior has the highest probability for introduction of ballast-mediated NIS *via* Lakers (Table 32). Probability of introduction for the remaining top ports in each vessel category ranged from lowest to lower, thus ballast–mediated NIS introduction is less likely at these ports.

### Magnitude of Consequences (Ballast Water)

The cumulative number of high impact ballast-mediated NIS at each top port by vessel category ranged from 3 to 868, representing 83 distinct NIS (Table 33; Appendix I). Montréal was rated highest for magnitude of potential consequences of NIS *via* international merchant vessels, with a cumulative number of 868 high impact ballast-mediated NIS (78 distinct NIS). Québec City was rated higher for magnitude of potential consequences of NIS *via* international merchant vessels, with a cumulative number of 625 high impact ballast-mediated NIS (75 distinct NIS). The remaining top ports from all vessel categories rated lowest to intermediate for magnitude of potential consequences by ballast-mediated NIS. It is noted that some of the high impact species identified in Appendix I have already established in the GLSLR region with ship ballast being the most probable transport vector including *Cercopagis pengoi*, *Dreissena polymorpha*, and *Neogobius melanostomus*.

### Final Invasion Risk (Ballast Water)

Duluth-Superior has higher invasion risk for ballast-mediated invasions *via* Laker ballast water discharge (Table 34). For the remaining top ports, 2 had intermediate invasion risk and 6 had lower invasion risk for ballast-mediated NIS invasions.

## SECONDARY SPREAD BY BALLAST WATER

Montréal and Québec City have highest and higher potential for ballast-mediated spread of NIS within Canada, respectively (Table 35). Both ports are top ports for international and coastal domestic merchant vessel traffic and therefore may serve as hubs for stepping stone invasions if ballast-mediated NIS successfully establish at these ports. Spread potential for the remaining top ports ranged from lowest to intermediate potential and therefore these ports may play a less prominent role in the spread of ballast-mediated NIS within Canada.

## THE FUTURE OF SHIP-MEDIATED INVASIONS IN THE GLSLR REGION

Effective ballast management regulations coupled with an intensive inspection regime for international vessels appear to have successfully reduced the future risk of introduction of new NIS from foreign ports (Bailey et al. 2011). Ballast water management systems utilizing technologies like filtration and chlorination can further reduce invasion risk by lowering propagule pressure more consistently than exchange methods; these systems are expected to be required for international vessels arriving to the GLSLR by 2016 (IMO 2004; Canada Shipping Act 2006). As a result, this study indicates that unregulated domestic vessels, particularly Lakers, should be the focus of future efforts to reduce impacts of NIS in the GLSLR. Given the very high probabilities for survival in this study, and that the annual volume of ballast water moved within the GLSLR by domestic ships is 20-100 times greater than the historical annual volume of water released by international vessels (Ruiz and Reid 2007), domestic shipping is a very important mechanism for spread of NIS. While management of spread is a lower priority than management of new introductions, taking action to reduce rapid and widespread dispersal of NIS has been recommended to reduce the magnitude of ecological and economic impacts of NIS (Lodge et al. 1998; Floerl et al. 2009).

The results presented in this report are based on current shipping patterns and environmental conditions; any changes to one or both factors in the future would lead to changes in ship-mediated invasion risk. In particular, recent efforts to increase shipping traffic along 'Highway

$H_2O$' could result in higher propagule pressure to the GLSLR region and/or establish new connections with highly environmentally similar global source ports – such as those listed in Appendices A through G. Further, climate change scenarios predict both thermal and physical changes in the GLSLR which could impact analyses of environmental similarity between connected source and donor ports (Magnuson et al. 1997). A reanalysis of environmental similarity between donor and recipient port-pairs, using environmental variables as projected under climate change, may be useful to predict future invasion risk in the region.

## CONCLUSIONS

- Freshwater ports of the Great Lakes and St. Lawrence River (GLSLR) are connected to international and coastal domestic ports, resulting in potential for species transfers *via* hull fouling and/or ballast water discharge.
- More than 90% of ship arrivals and ballast water discharge originated from domestic ports, making domestic vessels an important mechanism for movement (secondary spread) of nonindigenous species (NIS) in the GLSLR region.
- The final invasion risk for nonindigenous species *via* hull fouling was intermediate for Montréal (Québec), Québec City (Québec) and Duluth-Superior (Minnesota-Superior), and lower for all remaining top GLSLR ports.
- Duluth-Superior was identified as having higher overall invasion risk for NIS *via* ballast water, with Québec City and Montréal having intermediate invasion risk, and all remaining top GLSLR ports having lower final invasion risk.
- Burns Harbor (Indiana), Nanticoke (Ontario), and St. Clair (Michigan) are potentially important sources of ballast-mediated NIS for Duluth-Superior due to relatively high propagule supply and environmental similarity.
- Biological sampling of ship vectors should be conducted at top GLSLR ports to further quantify relative invasion risk with consideration of species-specific and site-specific characteristics.
- Future research and/or monitoring activities in the GLSLR should be prioritized at the top ports identified as higher risk by this assessment.
- It is important to note that results presented in this document are based on a relative risk ranking system, allowing prioritization of ports within the GLSLR. Relative rankings may change in the comprehensive national risk assessment considering differences in intensity of shipping traffic and environmental conditions across regions.

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## TABLES

*Table 1. Description of uncertainty levels (level of knowledge; source of data), modified from Therriault and Herborg (2007).*

| Level of uncertainty | Description |
|---|---|
| Very high | Little or no scientific information; no supporting data |
| High | Limited scientific information; circumstantial evidence |
| Moderate | Moderate level of scientific information; first hand, unsystematic observations |
| Low | Substantial scientific information; expert opinion |
| Very low | Extensive scientific/systematic information; peer-reviewed data sources/information |

*Table 2. Vessel classification system based on operational region and ship type with corresponding definitions and examples.*

| Vessel classification | Definition/Example |
|---|---|
| **Operational region** | |
| Laker | Vessels that operated exclusively within the GLSLR region during the study period and are not required to conduct ballast exchange/flushing |
| Coastal domestic | Vessels that operated exclusively within the Canadian Exclusive Economic Zone (EEZ) during the study period and are not required to conduct ballast exchange/flushing |
| International | Vessels that operated outside of the Canadian EEZ for at least part of the study period and are required to conduct ballast exchange/flushing prior to entering the Canadian EEZ; some vessels will move domestic ballast water (not required to exchange/flush) on subsequent voyages within the EEZ |
| **Ship type** | |
| Merchant | Bulk carriers, tankers, general cargo, and roll on/roll off vessels |

*Table 3. Ranking system for probability of arrival of NIS to GLSLR ports via hull fouling, based on the annual number of vessel arrivals to each GLSLR port by vessel type.*

| Annual number of vessel arrivals | P(Arrival) |
|---|---|
| 896 – 1,118 | Highest |
| 672 – 895 | Higher |
| 448 - 671 | Intermediate |
| 224 - 447 | Lower |
| 0 - 223 | Lowest |

*Table 4. Ranking system for magnitude of consequences of invasion by hull fouling-mediated species, based on cumulative number of high impact NIS recorded by Molnar et al. (2008) in ecoregions of all ports directly connected to each GLSLR top port.*

| Cumulative number of high impact fouling NIS | Magnitude of consequence |
|---|---|
| 1,148 – 1,434 | Highest |
| 861 – 1,147 | Higher |
| 574 – 860 | Intermediate |
| 287 – 573 | Lower |
| 0 – 286 | Lowest |

*Table 5. Matrix used to combine probability of introduction and magnitude of consequences of introduction into final risk rankings, modified from Therriault and Herborg (2007); green = lower risk, yellow = intermediate risk and red = higher risk.*

| | | P (Introduction) | | | | |
|---|---|---|---|---|---|---|
| | | **Lowest** | **Lower** | **Intermediate** | **Higher** | **Highest** |
| **Consequence** | **Highest** | ▨ | ▨ | ■ | ■ | ■ |
| | **Higher** | ▨ | ▨ | ▨ | ■ | ■ |
| | **Intermediate** | ■ | ▨ | ▨ | ▨ | ■ |
| | **Lower** | ■ | ■ | ▨ | ▨ | ▨ |
| | **Lowest** | ■ | ■ | ■ | ▨ | ▨ |

*Table 6. Ranking system for probability of spread of NIS among Canadian ports via hull fouling based on annual number of vessel departures from top GLSLR ports by coastal domestic and Laker vessels.*

| Number of annual vessel departures | P(Spread) |
|---|---|
| 600 - 749 | Highest |
| 450 – 599 | Higher |
| 300 – 449 | Intermediate |
| 150 – 299 | Lower |
| 0 – 149 | Lowest |

*Table 7. Ranking system for probability of arrival of NIS to GLSLR ports via ballast water, based on annual corrected volume of ballast water discharged at a single GLSLR port.*

| Annual corrected volume of ballast water discharged ($m^3$) | P(Arrival) |
|---|---|
| 16,247,989 – 20,309,985 | Highest |
| 12,185,992 – 16,247,988 | Higher |
| 8,123,995 – 12,185,991 | Intermediate |
| 4,061,998 – 8,123,994 | Lower |
| 0 – 4,061,997 | Lowest |

*Table 8. Ranking system for probability of survival of NIS at top GLSLR ports, based on environmental distance between top GLSLR ports and all connected ballast water source ports.*

| Environmental distance | P(Survival) |
|---|---|
| 0.00 – 1.12 | Highest |
| 1.13 – 2.24 | Higher |
| 2.25 – 3.36 | Intermediate |
| 3.37 – 4.48 | Lower |
| 4.49 – 5.60 | Lowest |

*Table 9. Ranking system for magnitude of consequences of introduction of ballast-mediated species, based on cumulative number of high impact NIS recorded by Molnar et al. (2008) in ecoregions of all ports directly connected to each GLSLR top port.*

| Cumulative number of high impact ballast-mediated NIS | Magnitude of consequence |
|---|---|
| 696 – 869 | Highest |
| 522 – 695 | Higher |
| 348 – 521 | Intermediate |
| 174 – 347 | Lower |
| 0 – 173 | Lowest |

*Table 10. Ranking system for probability of spread of NIS among Canadian ports via ballast water, based on the annual number of ballast water uptake events at top GLSLR ports by coastal domestic and Laker vessels.*

| Annual number of uptake events | P(Spread) |
|---|---|
| 172 – 214 | Highest |
| 129 – 171 | Higher |
| 86 – 128 | Intermediate |
| 43 – 85 | Lower |
| 0 – 42 | Lowest |

*Table 11. Arrival statistics for international merchant vessels at the top 10 GLSLR ports. The asterisk (*) denotes the top three ports for this vessel category. Note that Cleveland and Toledo had the same number of vessel arrivals and therefore were both included as rank #10.*

| Top ports | Annual number of arrivals | P(Arrival) at port |
|---|---|---|
| Montréal, QC* | 1,118 | Highest |
| Québec City, QC * | 559 | Intermediate |
| Sorel-Tracy, QC* | 241 | Lower |
| Hamilton, ON | 133 | Lowest |
| Trois-Rivières, QC | 128 | Lowest |
| Bécancour, QC | 116 | Lowest |
| Contrecœur, QC | 67 | Lowest |
| Toronto, ON | 43 | Lowest |
| Valleyfield, QC | 41 | Lowest |
| Cleveland, OH | 40 | Lowest |
| Toledo, OH | 40 | Lowest |

*Table 12. Arrival statistics for coastal merchant vessels at the top 10 GLSLR ports. The asterisk (*) denotes the top three ports for this vessel category.*

| Top ports | Annual number of arrivals | P(Arrival) at port |
|---|---|---|
| Montréal, QC* | 269 | Lower |
| Québec City, QC* | 208 | Lowest |
| Sorel-Tracy, QC* | 123 | Lowest |
| Hamilton, ON | 54 | Lowest |
| Toledo, OH | 53 | Lowest |
| Côte Ste-Catherine, QC | 49 | Lowest |
| Trois-Rivières, QC | 36 | Lowest |
| Valleyfield, QC | 18 | Lowest |
| Burns Harbor, IN | 17 | Lowest |
| Bécancour, QC | 14 | Lowest |

*Table 13. Arrival statistics for Lakers at the top 10 GLSLR ports. The asterisk (*) denotes the top three ports for this vessel category.*

| Top ports | Annual number of arrivals | P(Arrival) at port |
|---|---|---|
| Duluth-Superior, MN-WI* | 748 | Higher |
| Detroit-Ecorse, MI* | 507 | Intermediate |
| Cleveland, OH* | 366 | Lower |
| Presque Isle-Marquette, MI | 327 | Lower |
| Toledo, OH | 318 | Lower |
| Calcite, MI | 305 | Lower |
| Nanticoke, ON | 272 | Lower |
| Sault Ste. Marie, ON | 254 | Lower |
| Stoneport, MI | 250 | Lower |
| Two Harbors, MN | 234 | Lower |

*Table 14. Probability of introduction of hull-mediated NIS to top GLSLR ports, by vessel category, with level of uncertainty indicated in brackets below each column heading.*

| | P(Arrival) (moderate) | P(Survival) (moderate) | P(Introduction) (moderate) |
|---|---|---|---|
| **International merchant vessels** | | | |
| Montréal, QC | Highest | Lowest | Lowest |
| Québec City, QC | Intermediate | Lowest | Lowest |
| Sorel-Tracy, QC | Lower | Lowest | Lowest |
| **Coastal domestic merchant vessels** | | | |
| Montréal, QC | Lower | Lowest | Lowest |
| Québec City, QC | Lowest | Lowest | Lowest |
| Sorel-Tracy, QC | Lowest | Lowest | Lowest |
| **Laker merchant vessels** | | | |
| Duluth-Superior, MN-WI | Higher | Highest | Higher |
| Detroit-Ecorse, MI | Intermediate | Highest | Intermediate |
| Cleveland, OH | Lower | Highest | Lower |

*Table 15. Magnitude of consequences of introduction of hull fouling-mediated species at top GLSLR ports, by vessel category, based on the cumulative number of high impact NIS recorded by Molnar et al. (2008) in ecoregions of all ports directly connected to each GLSLR top port.*

| | **Cumulative number of high impact fouling NIS** | **Magnitude of consequence** |
|---|---|---|
| **International merchant vessels** | | |
| Montréal, QC | 1,433 | Highest |
| Québec City, QC | 975 | Higher |
| Sorel-Tracy, QC | 651 | Intermediate |
| **Coastal domestic merchant vessels** | | |
| Montréal, QC | 112 | Lowest |
| Québec City, QC | 136 | Lowest |
| Sorel-Tracy, QC | 35 | Lowest |
| **Laker merchant vessels** | | |
| Duluth-Superior, MN-WI | 126 | Lowest |
| Detroit-Ecorse, MI | 110 | Lowest |
| Cleveland, OH | 364 | Lower |

*Table 16. Relative invasion risk to top GLSLR ports by hull fouling NIS, by vessel category, with level of uncertainty indicated in brackets below each column heading.*

| | **P(Introduction)** (moderate) | **Magnitude of consequence** (moderate) | **Invasion risk** (moderate) |
|---|---|---|---|
| **Top ports for international merchant arrivals** | | | |
| Montréal, QC | Lowest | Highest | Intermediate |
| Québec City, QC | Lowest | Higher | Intermediate |
| Sorel-Tracy, QC | Lowest | Intermediate | Lower |
| **Top ports for coastal domestic merchant arrivals** | | | |
| Montréal, QC | Lowest | Lowest | Lower |
| Québec City, QC | Lowest | Lowest | Lower |
| Sorel-Tracy, QC | Lowest | Lowest | Lower |
| **Top ports for Laker merchant arrivals** | | | |
| Duluth-Superior, MN-WI | Higher | Lowest | Intermediate |
| Detroit-Ecorse, MI | Intermediate | Lowest | Lower |
| Cleveland, OH | Lower | Lower | Lower |

*Table 17. Departure statistics for coastal domestic and Laker vessels from top GLSLR ports as a measure of potential for hull-mediated secondary spread.*

| | Annual number of departures | P(Spread) |
|---|---|---|
| **Top ports for international merchant vessels** | | |
| Montréal, QC | 291 | Lower |
| Québec City, QC | 278 | Lower |
| Sorel-Tracy, QC | 145 | Lowest |
| **Top ports for coastal domestic merchant vessels** | | |
| Montréal, QC | 291 | Lower |
| Québec City, QC | 278 | Lower |
| Sorel-Tracy, QC | 145 | Lowest |
| **Top ports for Laker merchant vessels** | | |
| Duluth-Superior, MN-WI | 749 | Highest |
| Detroit-Ecorse, MI | 512 | Higher |
| Cleveland, OH | 369 | Intermediate |

*Table 18. Discharge statistics at GLSLR ports, by source of ballast water, for a 12 month period. Correction factors (10% for saline and 1% for freshwater source ports, respectively) were applied to account for reduction in propagule supply due to exchange/flushing. 'Direct' refers to water that was not exchanged prior to discharging.*

| | Ballast water discharge volume ($m^3$) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Number of discharge events | Grand total | Corrected foreign exchanged | | Corrected coastal domestic exchanged | | Domestic direct (saline water) | Domestic direct (freshwater) | Corrected total |
| | | 10% | 1% | 10% | 1% | | | |
| 5683 | 73,573,813 | 123,936 | 954 | 1,442 | 89 | 1,609,319 | 70,606,454 | 72,342,194 |

*Table 19. Discharge statistics at GLSLR ports, by ballast water source region, for a 12 month period. Corrected total volume reflects adjustments to account for reduction in propagule supply due to exchange/flushing.*

| **FAO source region** | **Ballast water volume discharged ($m^3$)** | |
|---|---|---|
| | **Total** | **Corrected Total** |
| Great Lakes | 70,617,086.38 | 70,606,542.76 |
| NW Atlantic | 2,042,491.52 | 1,652,636.45 |
| NE Atlantic | 223,956.94 | 22,396.69 |
| North Sea | 219,031.45 | 21,903.15 |
| WC Atlantic | 110,640.60 | 11,064.06 |
| EC Atlantic | 99,505.18 | 9,950.52 |
| Mediterranean | 75,676.30 | 7,567.63 |
| unknown | 66,071.90 | 6,607.19 |
| Black Sea | 32,349.00 | 3,324.90 |
| Gulf of Mexico | 30,382.80 | 3,038.28 |
| NW Pacific | 17,377.60 | 1,737.76 |
| Arctic | 10,808.00 | 1,080.80 |
| Baltic Sea | 9,205.40 | 920.54 |
| WC Pacific | 3,923.90 | 392.39 |
| EC Pacific | 3,535.80 | 353.58 |
| Persian Gulf | 3,079.70 | 307.97 |
| E Indian Ocean | 2,819.00 | 281.90 |
| SW Atlantic | 2,257.90 | 225.79 |
| SE Atlantic | 2,081.52 | 208.15 |
| SE Pacific | 813.00 | 81.30 |
| Red Sea | 718.80 | 71.88 |

*Table 20. Ballast water discharge statistics for international merchant vessels at the top 10 GLSLR ports. Correction factors (10% for saline and 1% for freshwater source ports, respectively) were applied to account for reduction in propagule supply due to exchange/flushing. 'Direct' refers to water that was not exchanged prior to discharging. The asterisk (*) denotes the top three ports for this vessel category.*

| **Top 10 ports** | **Number of discharge events** | **Annual volume of ballast water discharge (m$^3$)** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **Grand total** | **Corrected foreign exchanged** | | **Coastal domestic direct** | **Great Lakes direct** | **Corrected total** | **P(Arrival)** |
| | | | **10%** | **1%** | | | | |
| Québec City, QC* | 232 | 1,708,777 | 39,247 | 80 | 452,589 | 855,768 | 1,347,684 | Lowest |
| Sorel-Tracy, QC* | 86 | 951,871 | 19,291 | 69 | 209,172 | 542,899 | 771,431 | Lowest |
| Montréal, QC* | 208 | 994,436 | 24,697 | 143 | 177,595 | 555,567 | 758,002 | Lowest |
| Trois-Rivières, QC | 31 | 252,173 | 3,765 | 57 | 37,804 | 171,003 | 212,629 | Lowest |
| Duluth-Superior, MN-WI | 129 | 354,936 | 17,430 | 119 | 65,990 | 102,730 | 186,269 | Lowest |
| Sarnia, ON | 27 | 121,081 | 4,419 | 192 | 30,820 | 26,888 | 62,319 | Lowest |
| Thunder Bay, ON | 15 | 82,408 | 2,040 | 89 | 17,470 | 35,652 | 55,251 | Lowest |
| Hamilton, ON | 13 | 62,541 | 958 | 0 | 41,214 | 11,748 | 53,920 | Lowest |
| Contrecœur, QC | 14 | 83,345 | 3,351 | 0 | 18,841 | 30,992 | 53,184 | Lowest |
| Toledo, OH | 13 | 57,329 | 1,872 | 14 | 8,853 | 28,369 | 39,108 | Lowest |

*Table 21. Ballast water discharge statistics for coastal domestic merchant vessels at the top 10 GLSLR ports. Correction factors (10% for saline and 1% for freshwater source ports, respectively) were applied to account for reduction in propagule supply due to exchange/flushing. 'Direct' refers to water that was not exchanged prior to discharging. The asterisk (*) denotes the top three ports for this vessel category.*

| Top 10 ports | Number of discharge events | Annual volume of ballast water discharge ($m^3$) | | | |
|---|---|---|---|---|---|
| | | Grand total | Coastal domestic direct | Great Lakes direct | P(Arrival) |
| Québec City, QC* | 117 | 1,050,130 | 268,382 | 781,748 | Lowest |
| Montréal, QC* | 76 | 405,786 | 149,969 | 255,817 | Lowest |
| Toronto, ON* | 7 | 94,170 | 0 | 94,170 | Lowest |
| Sorel-Tracy, QC | 22 | 78,184 | 41,723 | 36,461 | Lowest |
| Nanticoke, ON | 11 | 61,569 | 41,259 | 20,310 | Lowest |
| Sarnia, ON | 10 | 47,935 | 4,800 | 43.135 | Lowest |
| Goderich-Owen Sound, ON | 3 | 40,562 | 0 | 40,562 | Lowest |
| Thunder Bay, ON | 3 | 35,350 | 0 | 35,350 | Lowest |
| Duluth-Superior, MN-WI | 2 | 31,135 | 13,875 | 17,260 | Lowest |
| Two Harbors, MN | 2 | 30,020 | 0 | 30,020 | Lowest |

Note that 7,429 $m^3$ of ballast water voluntarily exchanged by coastal domestic vessels was not destined for a top 10 ports, thus the 'Corrected total' volume is equal to the 'Grand total' and is omitted from this table.

*Table 22. Ballast water discharge statistics for Lakers at the top 10 GLSLR ports. Correction factors (10% for saline and 1% for freshwater source ports, respectively) were applied to account for reduction in propagule supply due to exchange/flushing. 'Direct' refers to water that was not exchanged prior to discharging. The asterisk (*) denotes the top three ports for this vessel category.*

| **Top 10 ports** | **Number of discharge events** | **Annual volume of ballast water discharge ($m^3$)** | | |
|---|---|---|---|---|
| | | **Grand total** | **Great Lakes direct** | **P(Arrival)** |
| Duluth-Superior, MN-WI* | 704 | 20,309,985 | 20,309,985 | Highest |
| Two Harbors, MN* | 233 | 7,936,582 | 7,936,582 | Lower |
| Presque Isle-Marquette, MI* | 301 | 3,499,006 | 3,499,006 | Lowest |
| Calcite, MI | 286 | 3,410,533 | 3,410,533 | Lowest |
| Stoneport, MI | 244 | 2,969,045 | 2,969,045 | Lowest |
| Port Inland, MI | 201 | 2,384,524 | 2,384,524 | Lowest |
| Toledo, OH | 182 | 2,353,340 | 2,353,340 | Lowest |
| Thunder Bay, ON | 194 | 2,184,032 | 2,184,032 | Lowest |
| Silver Bay, MN | 147 | 2,160,780 | 2,160,780 | Lowest |
| Bruce Mines-Thessalon-Meldrum-Serpent Harbour, ON | 222 | 2,118,398 | 2,118,398 | Lowest |

Note that all ballast water moved by Lakers was discharged directly, thus the 'Corrected total' volume is equal to the 'Grand total' and is omitted from this table.

*Table 23. Environmental distance between Québec City and source ports connected via ballast water discharge by international merchant vessels. The asterisk (*) denotes source ports that received higher or highest probability of survival.*

| Source port | Source port country | Environmental distance | P(Survival) |
|---|---|---|---|
| Albany* | United States | 0.62 | Highest |
| Algiers | Algeria | 3.48 | Lower |
| Baie-Comeau | Canada | 3.00 | Intermediate |
| Baltimore* | United States | 1.72 | Higher |
| Barranquilla | Colombia | 4.18 | Lower |
| Bécancour* | Canada | 0.02 | Highest |
| Bronte* | Canada | 0.34 | Highest |
| Camden* | United States | 1.21 | Higher |
| Cap-aux-Meules | Canada | 2.33 | Intermediate |
| Casablanca | Morocco | 3.54 | Lower |
| Chatham* | Canada | 2.06 | Higher |
| Chesapeake | United States | 2.64 | Intermediate |
| Cienfuegos | Cuba | 4.08 | Lower |
| Clarkson* | Canada | 0.34 | Highest |
| Come By Chance | Canada | 2.40 | Intermediate |
| Contrecœr* | Canada | 0.17 | Highest |
| Corner Brook* | Canada | 1.14 | Higher |
| Corpus Christi | United States | 3.09 | Intermediate |
| Côte-Sainte-Catherine* | Canada | 0.31 | Highest |
| Cuxhaven* | Germany | 1.98 | Higher |
| Djen-Djen | Algeria | 3.54 | Lower |
| Eemshaven | Netherlands | 2.37 | Intermediate |
| Ferrol | Spain | 3.10 | Intermediate |
| Gaspé* | Canada | 2.18 | Higher |
| Gijon | Spain | 3.10 | Intermediate |
| Goose Bay* | Canada | 0.86 | Highest |
| Greenore | Ireland | 2.27 | Intermediate |
| Halifax* | Canada | 1.70 | Higher |
| Hamburg* | Germany | 1.97 | Higher |
| Hamilton* | Canada | 0.37 | Highest |
| Havana | Cuba | 4.46 | Lower |
| Immingham | United Kingdom | 2.73 | Intermediate |
| Iqaluit | Canada | 3.14 | Intermediate |
| Les Méchins | Canada | 2.60 | Intermediate |
| Liverpool* | United Kingdom | 1.71 | Higher |
| Long Pond | Canada | 2.69 | Intermediate |
| Marystown | Canada | 2.62 | Intermediate |
| Mayagüez | Puerto Rico | 4.45 | Lower |
| Mississauga* | Canada | 0.31 | Highest |
| Montréal* | Canada | 0.34 | Highest |
| New York & New Jersey* | United States | 1.48 | Higher |
| Norfolk | United States | 2.64 | Intermediate |
| Oakville* | Canada | 0.34 | Highest |
| Oshawa* | Canada | 0.32 | Highest |
| Philadelphia* | United States | 1.21 | Higher |

| | | | |
|---|---|---|---|
| Port Alfred* | Canada | 1.95 | Higher |
| Port Cartier | Canada | 2.28 | Intermediate |
| Port Everglades | United States | 4.66 | Lowest |
| Port Menier | Canada | 2.32 | Intermediate |
| Portland (Maine) | United States | 2.46 | Intermediate |
| Porvoo* | Finland | 0.63 | Highest |
| Providence* | United States | 1.08 | Highest |
| Rimouski | Canada | 2.75 | Intermediate |
| San Juan | Puerto Rico | 4.54 | Lowest |
| San Pedro* | Argentina | 2.10 | Higher |
| Sapele | Nigeria | 4.01 | Lower |
| Sarnia* | Canada | 0.38 | Highest |
| Sault Ste. Marie* | Canada | 0.43 | Highest |
| Savannah | United States | 2.44 | Intermediate |
| Savona-Vado | Italy | 3.14 | Intermediate |
| Searsport* | United States | 1.03 | Highest |
| Sept-Iles | Canada | 2.55 | Intermediate |
| Sorel-Tracy* | Canada | 0.19 | Highest |
| St. Barbe | Canada | 2.49 | Intermediate |
| St. Pierre Bank | Canada | 2.39 | Intermediate |
| Toronto* | Canada | 0.31 | Highest |
| Trois-Rivières* | Canada | 0.02 | Highest |
| Wilmington (North Carolina) | United States | 3.32 | Intermediate |
| **Overall** | | **2.04** | **Higher** |

*Table 24. Environmental distance between Sorel-Tracy and source ports connected via ballast water discharge by international merchant vessels. The asterisk (*) denotes source ports that received higher or highest probability of survival.*

| Source port | Source port country | Environmental distance | P(Survival) |
|---|---|---|---|
| Agioi Theodoroi | Greece | 3.31 | Intermediate |
| Antwerp* | Belgium | 0.90 | Highest |
| Aughinish* | Ireland | 1.39 | Higher |
| Baie-Comeau | Canada | 2.82 | Intermediate |
| Baton Rouge | United States | 2.37 | Intermediate |
| Bécancour* | Canada | 0.18 | Highest |
| Brake* | Germany | 2.15 | Higher |
| Brunswick | United States | 3.44 | Lower |
| Canso | Canada | 2.36 | Intermediate |
| Casablanca | Morocco | 3.49 | Lower |
| Chicoutimi* | Canada | 0.40 | Highest |
| Contrecœr* | Canada | 0.03 | Highest |
| Dartmouth* | Canada | 1.41 | Higher |
| Detroit-Ecorse* | United States | 0.37 | Highest |
| Dunkirk | France | 2.73 | Intermediate |
| Ereğli | Turkey | 2.43 | Intermediate |
| Fall River* | United States | 1.28 | Higher |
| Ghent* | Belgium | 0.94 | Highest |
| Hamilton* | Canada | 0.35 | Highest |
| Les Méchins | Canada | 2.71 | Intermediate |
| Mayagüez | Puerto Rico | 4.37 | Lower |
| Montréal* | Canada | 0.15 | Highest |
| New Haven | United States | 2.30 | Intermediate |
| New York & New Jersey* | United States | 1.34 | Higher |
| Newport News | United States | 2.52 | Intermediate |
| Oshawa* | Canada | 0.33 | Highest |
| Port Alfred* | Canada | 2.00 | Higher |
| Port Cartier | Canada | 2.35 | Intermediate |
| Québec* | Canada | 0.19 | Highest |
| Sarnia* | Canada | 0.30 | Highest |
| Sept-Iles | Canada | 2.65 | Intermediate |
| Sheet Harbour | Canada | 2.33 | Intermediate |
| Summerside* | Canada | 2.10 | Higher |
| Sydney | Canada | 2.38 | Intermediate |
| Toronto* | Canada | 0.35 | Highest |
| Trois-Rivières* | Canada | 0.18 | Highest |
| Valleyfield* | Canada | 0.11 | Highest |
| Varna* | Bulgaria | 1.51 | Higher |
| Vlissingen | Netherlands | 2.57 | Intermediate |
| Windsor* | Canada | 0.34 | Highest |
| Yonkers* | United States | 0.93 | Highest |
| **Overall** | | **1.62** | **Higher** |

*Table 25. Environmental distance between Montréal and source ports connected via ballast water discharge by international merchant vessels. The asterisk (*) denotes source ports that received higher or highest probability of survival.*

| Source port | Source port country | Environmental distance | P(Survival) |
|---|---|---|---|
| Acajutla | El Salvador | 4.57 | Lowest |
| Amsterdam* | Netherlands | 1.10 | Highest |
| Antofagasta | Chile | 3.22 | Intermediate |
| Antwerp* | Belgium | 0.89 | Highest |
| Argentia | Canada | 2.80 | Intermediate |
| Baie-Comeau | Canada | 2.90 | Intermediate |
| Baltimore* | United States | 1.46 | Higher |
| Bay City* | United States | 0.21 | Highest |
| Beaumont | United States | 3.15 | Intermediate |
| Bécancour* | Canada | 0.32 | Highest |
| Bilbao | Spain | 2.26 | Intermediate |
| Brake* | Germany | 2.15 | Higher |
| Bronte* | Canada | 0.35 | Highest |
| Cap-aux-Meules | Canada | 2.44 | Intermediate |
| Casablanca | Morocco | 3.44 | Lower |
| Ceuta | Spain | 3.32 | Intermediate |
| Cienfuegos | Cuba | 3.89 | Lower |
| Clarkson* | Canada | 0.34 | Highest |
| Cleveland* | United States | 0.39 | Highest |
| Constantza* | Romania | 1.45 | Higher |
| Contrecœur* | Canada | 0.17 | Highest |
| Corner Brook* | Canada | 1.32 | Higher |
| Côte-Sainte-Catherine* | Canada | 0.03 | Highest |
| Dublin | Ireland | 3.00 | Intermediate |
| Ereğli* | Turkey | 1.77 | Higher |
| Fos | France | 3.04 | Intermediate |
| Fredericia* | Denmark | 1.70 | Higher |
| Freeport | Bahamas | 3.87 | Lower |
| Gaspé | Canada | 2.28 | Intermediate |
| Genoa | Italy | 3.01 | Intermediate |
| Ghent* | Belgium | 0.92 | Highest |
| Gioia Tauro | Italy | 3.44 | Lower |
| Gros-Cacouna* | Canada | 1.94 | Higher |
| Hamburg* | Germany | 2.00 | Higher |
| Hamilton* | Canada | 0.35 | Highest |
| Havana | Cuba | 4.29 | Lower |
| Holyrood | Canada | 2.46 | Intermediate |
| Immingham | United Kingdom | 2.81 | Intermediate |
| Kuujjuaq | Canada | 2.86 | Intermediate |
| Le Havre | France | 2.84 | Intermediate |
| Lisbon | Portugal | 2.25 | Intermediate |
| Liverpool* | United Kingdom | 1.76 | Higher |
| Livorno | Italy | 3.12 | Intermediate |
| Long Pond | Canada | 2.85 | Intermediate |

|  |  |  |  |
|---|---|---|---|
| Maceió | Brazil | 4.57 | Lowest |
| Milwaukee* | United States | 0.37 | Highest |
| Mississauga* | Canada | 0.40 | Highest |
| Moa | Cuba | 4.60 | Lowest |
| Morehead City | United States | 3.66 | Lower |
| Nanticoke* | Canada | 0.25 | Highest |
| New Haven | United States | 2.27 | Intermediate |
| New York & New Jersey* | United States | 1.24 | Higher |
| Oakville* | Canada | 0.36 | Highest |
| Oshawa* | Canada | 0.37 | Highest |
| Oswego* | United States | 0.29 | Highest |
| Philadelphia* | United States | 0.89 | Highest |
| Port Alfred* | Canada | 2.04 | Higher |
| Port Cartier | Canada | 2.40 | Intermediate |
| Praia Mole | Brazil | 4.22 | Lower |
| Québec* | Canada | 0.34 | Highest |
| Rimouski | Canada | 2.97 | Intermediate |
| Rio Haina | Dominican Republic | 4.57 | Lowest |
| Slaerno | Italy | 3.08 | Intermediate |
| Santiago | Cuba | 4.40 | Lower |
| Sarnia* | Canada | 0.26 | Highest |
| Sault Ste. Marie* | Canada | 0.66 | Highest |
| Savannah* | United States | 2.17 | Higher |
| Sept-Iles* | Canada | 2.72 | Higher |
| Sorel-Tracy* | Canada | 0.15 | Highest |
| Southampton* | Canada | 1.93 | Higher |
| St. Barbe | Canada | 2.63 | Intermediate |
| St. Petersburg* | Russia | 0.65 | Highest |
| Thamesport* | United Kingdom | 1.68 | Higher |
| Toronto* | Canada | 0.40 | Highest |
| Trois-Rivières* | Canada | 0.32 | Highest |
| Valencia | Spain | 3.36 | Intermediate |
| Valleyfield* | Canada | 0.05 | Highest |
| Vitoria | Brazil | 3.69 | Lower |
| Wilmington | United States | 3.16 | Intermediate |
| **Overall** |  | **2.05** | **Higher** |

*Table 26. Environmental distance between Québec City and source ports connected via ballast water discharge by coastal domestic merchant vessels. The asterisk (*) denotes source ports that received higher or highest probability of survival.*

| Source port | Source port country | Environmental distance | P(Survival) |
|---|---|---|---|
| Baie-Comeau | Canada | 2.69 | Intermediate |
| Bath* | Canada | 0.40 | Highest |
| Bécancour* | Canada | 1.28 | Higher |
| Bowmanville* | Canada | 0.30 | Highest |
| Bronte* | Canada | 0.34 | Highest |
| Chatham* | Canada | 2.06 | Higher |
| Clarkson* | Canada | 0.34 | Highest |
| Contrecœr* | Canada | 0.17 | Highest |
| Corner Brook* | Canada | 1.14 | Higher |
| Corunna* | Canada | 0.40 | Highest |
| Côte-Sainte-Catherine* | Canada | 0.31 | Highest |
| Fairport* | United States | 0.68 | Highest |
| Hamilton* | Canada | 0.37 | Highest |
| Holyrood | Canada | 2.38 | Intermediate |
| Iqaluit | Canada | 3.14 | Intermediate |
| Johnstown Harbour* | Canada | 0.31 | Highest |
| Long Pond | Canada | 2.69 | Intermediate |
| Montréal* | Canada | 0.34 | Highest |
| Morrisburg Harbour* | Canada | 0.23 | Highest |
| Nanticoke* | Canada | 0.52 | Highest |
| Oakville* | Canada | 0.34 | Highest |
| Ogdensburg* | United States | 0.31 | Highest |
| Port Alfred* | Canada | 1.95 | Higher |
| Port Cartier | Canada | 2.28 | Intermediate |
| Port-aux-Basques | Canada | 2.38 | Intermediate |
| Rimouski | Canada | 2.75 | Intermediate |
| Sarnia* | Canada | 0.38 | Highest |
| Sept-Iles | Canada | 2.55 | Intermediate |
| Sorel-Tracy* | Canada | 0.19 | Highest |
| St. John's | Canada | 2.70 | Intermediate |
| Stephenville | Canada | 2.38 | Intermediate |
| Toronto* | Canada | 0.31 | Highest |
| Trois-Rivières* | Canada | 0.02 | Highest |
| **Overall** | | **1.17** | **Higher** |

*Table 27. Environmental distance between Montréal and source ports connected via ballast water discharge by coastal domestic merchant vessels. The asterisk (*) denotes source ports that received higher or highest probability of survival.*

| Source port | Source port country | Environmental distance | P(Survival) |
|---|---|---|---|
| Arviat | Canada | 3.25 | Intermediate |
| Bath* | Canada | 0.40 | Highest |
| Bowmanville* | Canada | 0.30 | Highest |
| Bronte* | Canada | 0.35 | Highest |
| Broughton Island | Canada | 4.16 | Lower |
| Cape-aux-Meules | Canada | 2.44 | Intermediate |
| Cape Dorset | Canada | 4.13 | Lower |
| Clarkson* | United States | 0.34 | Highest |
| Corunna* | Canada | 0.25 | Highest |
| Côte-Sainte-Catherine* | Canada | 0.31 | Highest |
| Goose Bay* | Canada | 0.86 | Highest |
| Hamilton* | Canada | 0.35 | Highest |
| Holyrood | Canada | 2.46 | Intermediate |
| Iqaluit | Canada | 3.14 | Intermediate |
| Little Narrows* | Canada | 0.39 | Highest |
| Long Pond | Canada | 2.69 | Intermediate |
| Nanticoke* | Canada | 0.52 | Highest |
| Oakville* | Canada | 0.36 | Highest |
| Oswego* | Canada | 0.29 | Highest |
| Port Alfred* | Canada | 2.04 | Higher |
| Québec* | Canada | 0.34 | Highest |
| Rimouski | Canada | 2.97 | Intermediate |
| Sept-Iles | Canada | 2.55 | Intermediate |
| Sorel-Tracy* | Canada | 0.19 | Highest |
| St. John's | Canada | 2.70 | Intermediate |
| Trois-Rivières* | Canada | 0.02 | Highest |
| **Overall** | | **1.45** | **Higher** |

*Table 28. Environmental distance between Toronto and source ports connected via ballast water discharge by coastal domestic merchant vessels.*

| Source port | Source port country | Environmental distance | P(Survival) |
|---|---|---|---|
| Québec City | Canada | 0.31 | Highest |
| **Overall** | | **0.31** | **Highest** |

*Table 29. Environmental distance between Duluth-Superior and source ports connected via ballast water discharge by Lakers. The asterisk (*) denotes source ports that received higher or highest probability of survival.*

| Source port | Source port country | Environmental distance | P(Survival) |
|---|---|---|---|
| Alpena* | United States | 0.32 | Highest |
| Ashtabula* | United States | 0.91 | Highest |
| Buffalo* | United States | 0.90 | Highest |
| Burns Harbor* | United States | 0.76 | Highest |
| Calcite* | United States | 0.18 | Highest |
| Cedarville Harbor* | United States | 0.06 | Highest |
| Charlevoix Harbor* | United States | 0.40 | Highest |
| Chicago* | United States | 0.71 | Highest |
| Clarkson* | United States | 0.51 | Highest |
| Cleveland* | United States | 0.98 | Highest |
| Conneaut* | United States | 0.91 | Highest |
| Courtright* | Canada | 0.61 | Highest |
| Detroit-Ecorse* | United States | 0.81 | Highest |
| Erie* | United States | 0.90 | Highest |
| Escanaba* | United States | 0.36 | Highest |
| Essexville* | United States | 0.80 | Highest |
| Fairport* | United States | 0.96 | Highest |
| Gary* | United States | 0.74 | Highest |
| Goderich* | Canada | 0.43 | Highest |
| Grand Haven* | United States | 0.52 | Highest |
| Green Bay* | United States | 0.68 | Highest |
| Hamilton* | Canada | 0.50 | Highest |
| Habour Beach* | United States | 0.38 | Highest |
| Huron* | United States | 0.60 | Highest |
| Indiana Harbor* | United States | 0.76 | Highest |
| Little Current* | Canada | 0.43 | Highest |
| Lorain* | United States | 1.02 | Highest |
| Ludington* | United States | 0.29 | Highest |
| Marquette* | United States | 0.07 | Highest |
| Marysville* | United States | 0.60 | Highest |
| Menominee* | United States | 0.44 | Highest |
| Midland* | Canada | 0.39 | Highest |
| Milwaukee* | United States | 0.41 | Highest |
| Monroe* | United States | 1.07 | Highest |
| Montréal* | Canada | 0.72 | Highest |
| Morrisburg Harbour* | Canada | 0.61 | Highest |
| Muskegon* | Untied States | 0.46 | Highest |
| Nanticoke* | Canada | 0.80 | Highest |
| Ontonagon* | United States | 0.04 | Highest |
| Port Cartier* | Canada | 2.22 | Higher |
| Port Dolomite* | United States | 0.11 | Highest |
| Québec* | Canada | 0.46 | Highest |
| Saginaw* | United States | 0.83 | Highest |
| Sandusky* | United States | 1.09 | Highest |
| Sarnia* | Canada | 0.59 | Highest |

|  |  |  |  |
|---|---|---|---|
| Sault Ste. Marie* | Canada | 0.10 | Highest |
| Serpent Harbour* | Canada | 0.10 | Highest |
| Silver Bay* | United States | 0.46 | Highest |
| Sorel-Tracy* | Canada | 0.62 | Highest |
| St. Clair* | United States | 0.61 | Highest |
| Stoneport* | United States | 0.17 | Highest |
| Sturgeon Bay Harbor* | United States | 0.18 | Highest |
| Taconite Harbor* | United States | 0.46 | Highest |
| Thunder Bay* | Canada | 0.41 | Highest |
| Toledo* | United States | 1.10 | Highest |
| Toronto* | Canada | 0.41 | Highest |
| Two Harbors* | United States | 0.34 | Highest |
| Welland* | Canada | 0.81 | Highest |
| Windsor* | Canada | 0.78 | Highest |
| **Overall** |  | **0.59** | **Highest** |

*Table 30. Environmental distance between Two Harbors and source ports connected via ballast water discharge by Lakers. The asterisk (*) denotes source ports that received higher or highest probability of survival.*

| Source port | Source port country | Environmental distance | P(Survival) |
|---|---|---|---|
| Alpena* | United States | 0.64 | Highest |
| Ashtabula* | United States | 1.24 | Higher |
| Buffalo* | United States | 1.23 | Higher |
| Burns Harbor* | United States | 1.09 | Highest |
| Calumet* | United States | 0.28 | Highest |
| Charlevoix Harbor* | United States | 0.73 | Highest |
| Cleveland* | United States | 1.31 | Higher |
| Conneaut* | United States | 1.23 | Higher |
| Courtright* | Canada | 0.94 | Highest |
| Detroit-Ecorse* | United States | 1.14 | Higher |
| Duluth-Superior* | United States | 0.34 | Highest |
| Erie* | United States | 1.23 | Higher |
| Escanaba* | United States | 0.69 | Highest |
| Essexville* | United States | 1.14 | Higher |
| Gary* | United States | 1.07 | Highest |
| Grand Haven* | United States | 0.84 | Highest |
| Green Bay* | United States | 1.01 | Highest |
| Hamilton* | Canada | 0.82 | Highest |
| Huron* | United States | 1.37 | Higher |
| Indiana Harbor* | United States | 1.09 | Highest |
| Long Point* | Canada | 1.14 | Higher |
| Lorain* | United States | 1.35 | Higher |
| Marquette* | United States | 0.28 | Highest |
| Monroe* | United States | 1.40 | Higher |
| Munising* | United States | 0.28 | Highest |
| Muskegon* | Untied States | 0.77 | Highest |
| Nanticoke* | Canada | 1.13 | Higher |
| Ontonagon* | United States | 0.37 | Highest |
| Sandusky* | United States | 1.42 | Higher |
| Sault Ste. Marie* | Canada | 0.42 | Highest |
| Silver Bay* | United States | 0.15 | Highest |
| St. Clair* | United States | 0.94 | Highest |
| Sturgeon Bay Harbor* | United States | 0.50 | Highest |
| Superior, Wisconsin* | Untied States | 0.33 | Highest |
| Taconite Harbor* | United States | 0.12 | Highest |
| Toledo* | United States | 1.43 | Higher |
| **Overall** | | **0.87** | **Highest** |

*Table 31. Environmental distance between Presque Isle-Marquette and source ports connected via ballast water discharge by Lakers. The asterisk (*) denotes source ports that received higher or highest probability of survival.*

| Source port | Source port country | Environmental distance | P(Survival) |
|---|---|---|---|
| Alpena* | United States | 0.37 | Highest |
| Ashtabula* | United States | 0.96 | Highest |
| Bay City* | United States | 0.86 | Highest |
| Buffalo* | United States | 0.95 | Highest |
| Buffington* | United States | 0.81 | Highest |
| Burns Harbor* | United States | 0.81 | Highest |
| Calcite* | United States | 0.23 | Highest |
| Cedarville* | United States | 0.10 | Highest |
| Charlevoix* | United States | 0.45 | Highest |
| Chicago* | United States | 0.76 | Highest |
| Cleveland* | United States | 1.03 | Highest |
| Conneaut* | United States | 0.95 | Highest |
| Courtright* | Canada | 0.66 | Highest |
| Detroit-Ecorse* | United States | 0.86 | Highest |
| Drummond Island* | United States | 0.23 | Highest |
| Erie* | United States | 0.95 | Highest |
| Escanaba* | United States | 0.41 | Highest |
| Essexville* | United States | 0.86 | Highest |
| Fairport* | United States | 1.01 | Highest |
| Gary* | United States | 0.79 | Highest |
| Gladstone* | United States | 0.41 | Highest |
| Green Bay* | United States | 0.73 | Highest |
| Hamilton* | Canada | 0.54 | Highest |
| Harbor Beach* | United States | 0.43 | Highest |
| Indiana Harbor* | United States | 0.81 | Highest |
| Lorain* | United States | 1.07 | Highest |
| Manistee* | United States | 0.28 | Highest |
| Manitowoc* | United States | 0.26 | Highest |
| Marine City-Marysville* | Untied States | 0.66 | Highest |
| Midland* | Canada | 0.44 | Highest |
| Milwaukee* | United States | 0.46 | Highest |
| Muskegon* | United States | 0.49 | Highest |
| Nanticoke* | Canada | 0.85 | Highest |
| Saginaw* | United States | 0.89 | Highest |
| Sarnia* | Canada | 0.65 | Highest |
| Sault Ste. Marie* | Canada | 0.14 | Highest |
| Stoneport* | United States | 0.22 | Highest |
| Sturgeon Bay Harbor* | United States | 0.22 | Highest |
| Toledo* | United States | 1.15 | Higher |
| Trenton* | Canada | 0.73 | Highest |
| Two Harbors* | United States | 0.25 | Highest |
| Windsor* | Canada | 0.83 | Highest |
| Wyandotte* | United States | 1.02 | Highest |
| **Overall** | | **0.64** | **Highest** |

*Table 32. Probability of introduction of ballast-mediated NIS to top GLSLR ports, by vessel category, with level of uncertainty in brackets below each column heading.*

| | P(Arrival) (low) | P(Survival) (moderate) | P(Introduction) (moderate) |
|---|---|---|---|
| **International merchant vessel ballast water discharges** | | | |
| Québec City, QC | Lowest | Higher | Lowest |
| Sorel-Tracy, QC | Lowest | Higher | Lowest |
| Montréal, QC | Lowest | Higher | Lowest |
| **Coastal domestic merchant vessel ballast water discharges** | | | |
| Québec City, QC | Lowest | Higher | Lowest |
| Montréal, QC | Lowest | Higher | Lowest |
| Toronto, ON | Lowest | Highest | Lowest |
| **Laker merchant vessel ballast water discharges** | | | |
| Duluth-Superior, MN-WI | Highest | Highest | Highest |
| Two Harbors, MN | Lower | Highest | Lower |
| Presque Isle-Marquette, MI | Lowest | Highest | Lowest |

*Table 33. Magnitude of potential consequences of introduction of ballast-mediated species at top GLSLR ports, by vessel category, based on the cumulative number of high impact NIS recorded by Molnar et al. (2008) in ecoregions of all ports directly connected to each top port.*

| | Cumulative number of high impact ballast-mediated NIS | Magnitude of consequence |
|---|---|---|
| **International merchant ballast water discharges** | | |
| Québec City, QC | 625 | Higher |
| Sorel-Tracy, QC | 413 | Intermediate |
| Montréal, QC | 868 | Highest |
| **Coastal domestic merchant vessel ballast water discharges** | | |
| Québec City, QC | 160 | Lowest |
| Montréal, QC | 111 | Lowest |
| Toronto, ON | 3 | Lowest |
| **Laker merchant vessel ballast water discharges** | | |
| Duluth-Superior, MN-WI | 433 | Intermediate |
| Two Harbors, MN | 254 | Lower |
| Presque Isle-Marquette, MI | 330 | Lower |

*Table 34. Relative invasion risk to top GLSLR ports by ballast-mediated NIS, by vessel category, with level of uncertainty indicated in brackets below each column heading.*

| | **P(Introduction)** (moderate) | **Magnitude of consequence** (moderate) | **Invasion risk** (moderate) |
|---|---|---|---|
| **Top ports for international merchant ballast water discharges** | | | |
| Québec City, QC | Lowest | Higher | Intermediate |
| Sorel-Tracy, QC | Lowest | Intermediate | Lower |
| Montréal, QC | Lowest | Highest | Intermediate |
| **Top ports for coastal domestic merchant ballast water discharges** | | | |
| Québec City, QC | Lowest | Lowest | Lower |
| Montréal, QC | Lowest | Lowest | Lower |
| Toronto, ON | Lowest | Lowest | Lower |
| **Top ports for Laker merchant ballast water discharges** | | | |
| Duluth-Superior, MN-WI | Highest | Intermediate | Higher |
| Two Harbors, MN | Lower | Lower | Lower |
| Presque Isle-Marquette, MI | Lowest | Lower | Lower |

*Table 35. Ballast water uptake statistics for coastal domestic merchant and Laker vessels at top GLSLR ports as a measure of potential for ballast-mediated secondary spread.*

| | **Annual number of ballast water uptake events** | **P(Spread)** |
|---|---|---|
| **Top ports for international merchant vessels** | | |
| Québec City, QC | 138 | Higher |
| Sorel-Tracy, QC | 119 | Intermediate |
| Montréal, QC* | 212 | Highest |
| **Top ports for coastal domestic merchant vessels** | | |
| Québec City, QC | 138 | Higher |
| Montréal, QC | 212 | Highest |
| Toronto, ON | 93 | Intermediate |
| **Top ports for Laker merchant vessels** | | |
| Duluth-Superior, MN-WI | 44 | Lower |
| Two Harbors, MN | 1 | Lowest |
| Presque Isle-Marquette, MI | 27 | Lowest |

# FIGURES

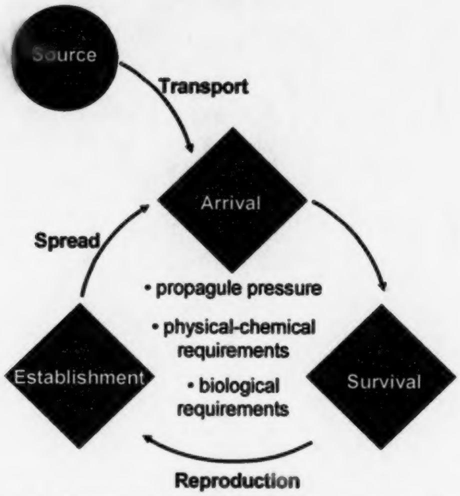

Source
Transport
Arrival
Spread
• propagule pressure
• physical-chemical requirements
• biological requirements
Establishment
Survival
Reproduction

*Figure 1. Stages of the biological invasion process.*

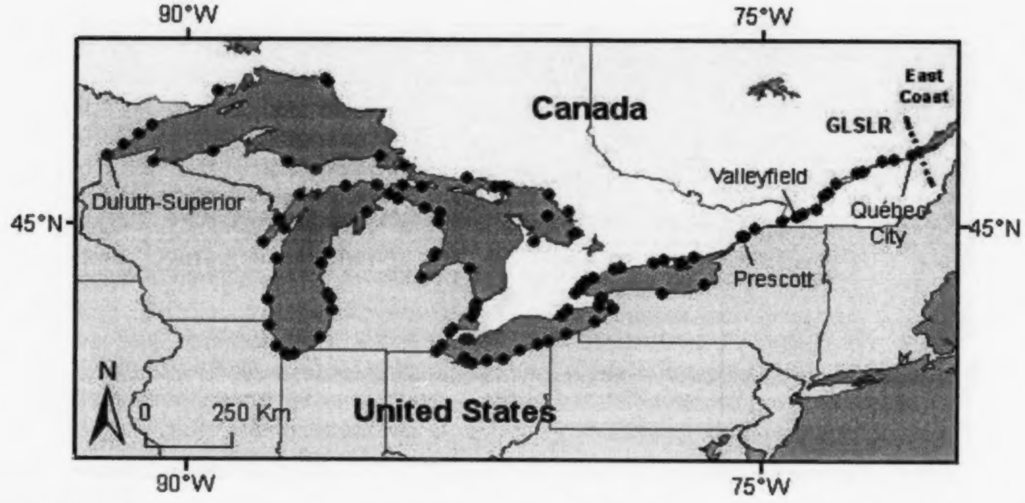
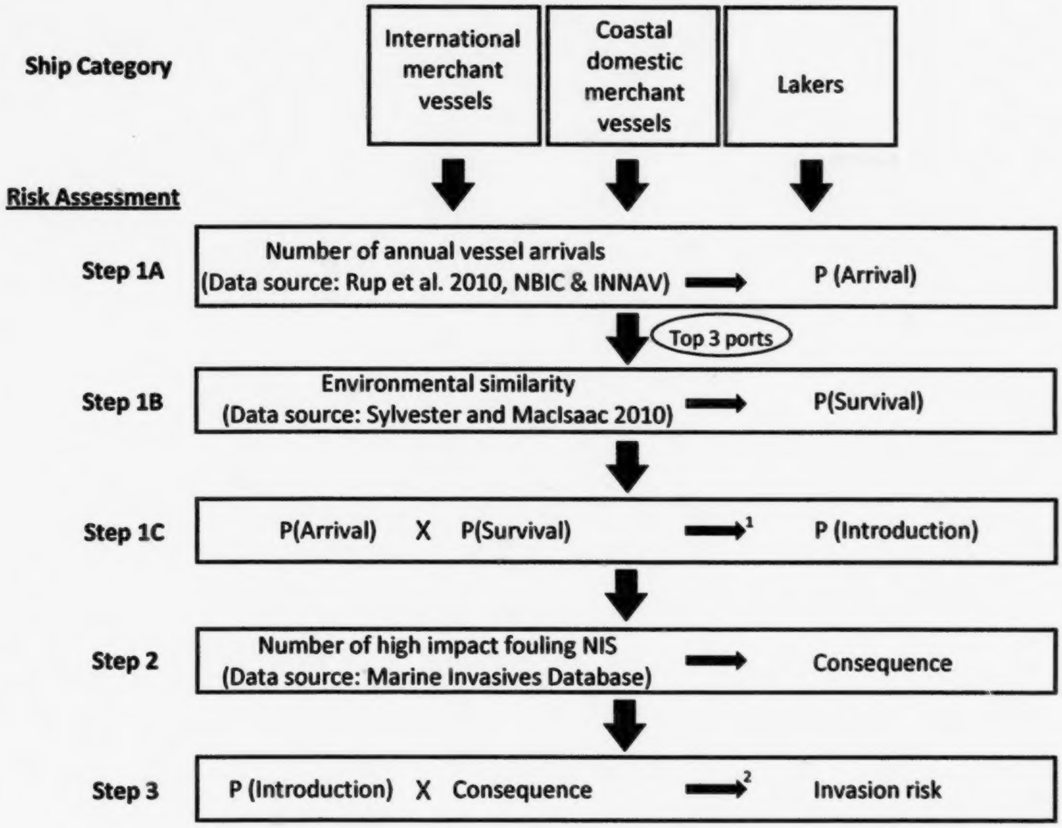
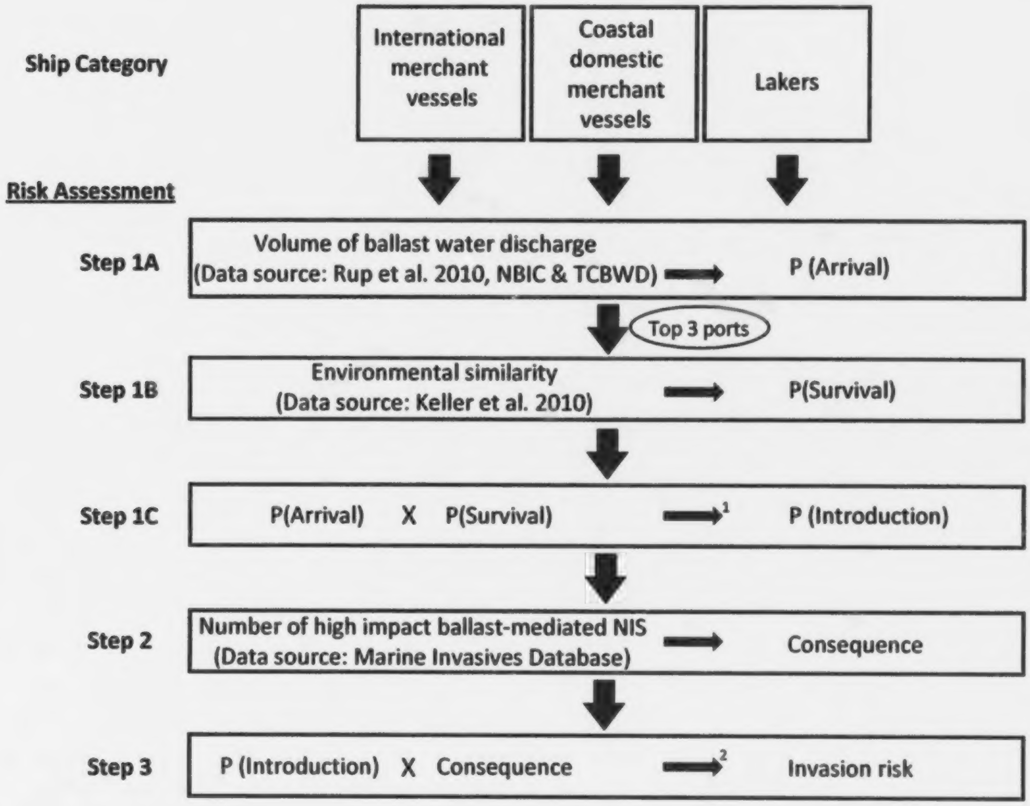

90°W
75°W
Canada
East Coast
GLSLR
Valleyfield
Duluth-Superior
Québec City
45°N
45°N
Prescott
N
0
250 Km
United States
90°W
75°W

*Figure 2. Map of the Great Lakes - St. Lawrence River (GLSLR) region, which includes the five Great Lakes and all freshwater ports in the St. Lawrence River, up to and including Québec City. The broken line demarcates the limit of the GLSLR region as defined in this risk assessment.*


Ship Category
International merchant vessels
Coastal domestic merchant vessels
Lakers
Risk Assessment
Step 1A
Number of annual vessel arrivals
(Data source: Rup et al. 2010, NBIC & INNAV)
P (Arrival)
Top 3 ports
Step 1B
Environmental similarity
(Data source: Sylvester and MacIsaac 2010)
P(Survival)
Step 1C
P(Arrival) X P(Survival)
1
P (Introduction)
Step 2
Number of high impact fouling NIS
(Data source: Marine Invasives Database)
Consequence
Step 3
P (Introduction) X Consequence
2
Invasion risk

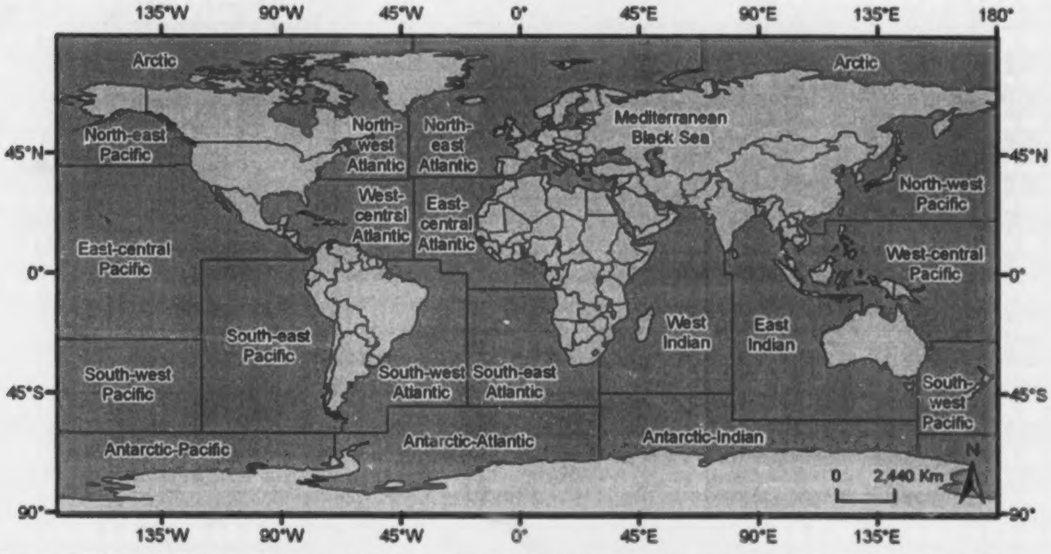
[1]Minimum probability approach; [2]Mixed rounding symmetrical approach

*Figure 3. Flow chart illustrating steps for risk assessment of hull fouling-mediated invasions. A filtering approach was used after Step 1A to prioritize the risk assessment to the top three GLSLR ports for each ship category.*


Ship Category
International merchant vessels
Coastal domestic merchant vessels
Lakers
Risk Assessment
Step 1A
Volume of ballast water discharge (Data source: Rup et al. 2010, NBIC & TCBWD)
P (Arrival)
Top 3 ports
Step 1B
Environmental similarity (Data source: Keller et al. 2010)
P(Survival)
Step 1C
P(Arrival) X P(Survival)
1
P (Introduction)
Step 2
Number of high impact ballast-mediated NIS (Data source: Marine Invasives Database)
Consequence
Step 3
P (Introduction) X Consequence
2
Invasion risk

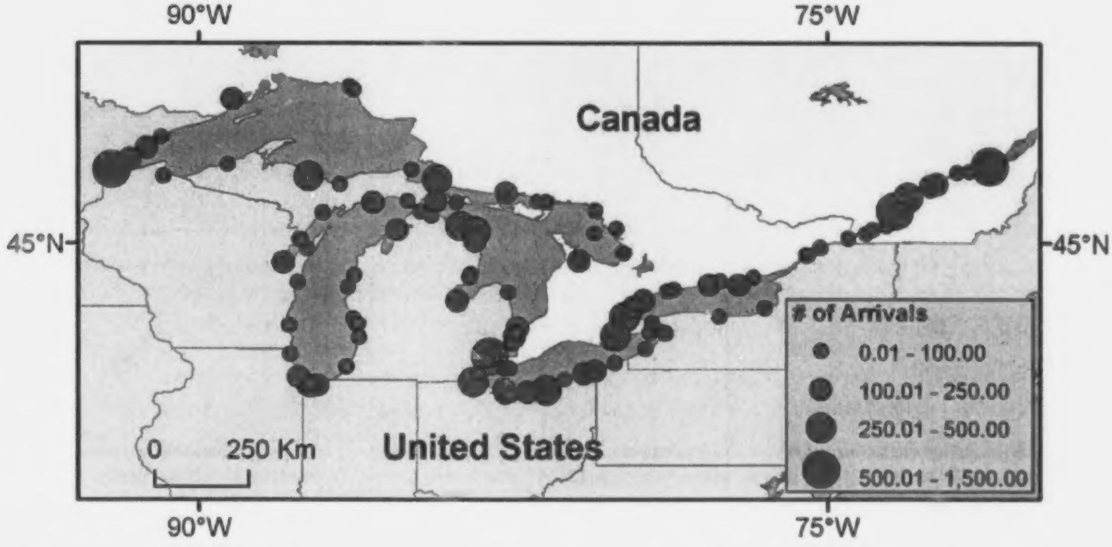
[1]Minimum probability approach; [2]Mixed rounding symmetrical approach

*Figure 4. Flow chart illustrating steps for risk assessment of ballast-mediated invasions. A filtering approach was used after Step 1A to prioritize the risk assessment to the top three GLSLR ports for each ship category.*



135°W
90°W
45°W
0°
45°E
90°E
135°E
180°
45°N
0°
45°S
90°
Arctic
North-east Pacific
North-west Atlantic
North-east Atlantic
Mediterranean Black Sea
Arctic
North-west Pacific
West-central Atlantic
East-central Atlantic
East-central Pacific
West-central Pacific
South-east Pacific
West Indian
East Indian
South-west Pacific
South-west Atlantic
South-east Atlantic
South-west Pacific
Antarctic-Pacific
Antarctic-Atlantic
Antarctic-Indian
0
2,440 Km
N

*Figure 5. Map illustrating regions of ballast water origin, following the ocean areas designated by the Food and Agriculture Organization of the United Nations (FAO).*



90°W
75°W
45°N
45°N
Canada
United States
0
250 Km
# of Arrivals
● 0.01 - 100.00
● 100.01 - 250.00
● 250.01 - 500.00
● 500.01 - 1,500.00
90°W
75°W

*Figure 6. Map illustrating the spatial distribution of vessel arrivals in the GLSLR region. Lakes are, from left to right, Superior, Michigan, Huron, Erie, and Ontario.*

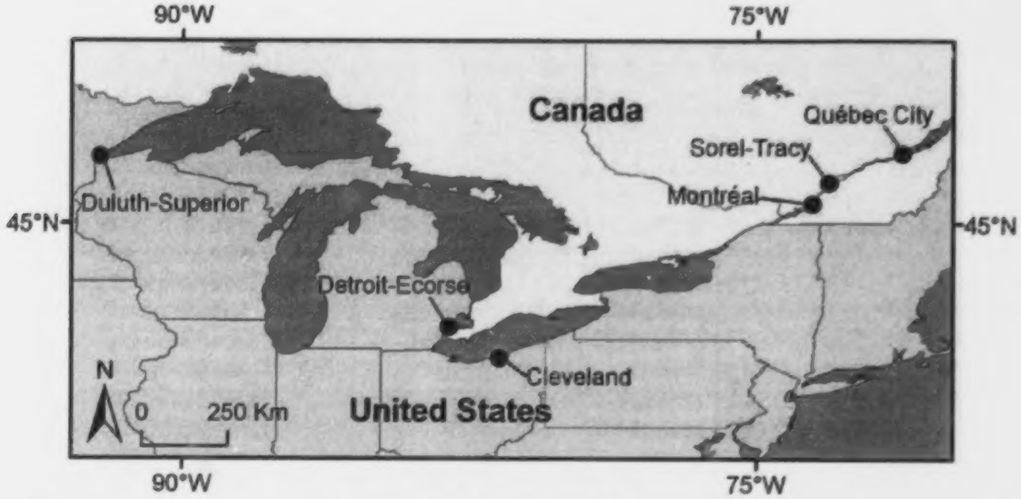

90°W
75°W
Canada
Québec City
Sorel-Tracy
Montréal
Duluth-Superior
45°N
45°N
Detroit-Ecorse
Cleveland
N
0
250 Km
United States
90°W
75°W

*Figure 7. Map illustrating locations of all top GLSLR ports based on the number of vessel arrivals for all vessel categories.*

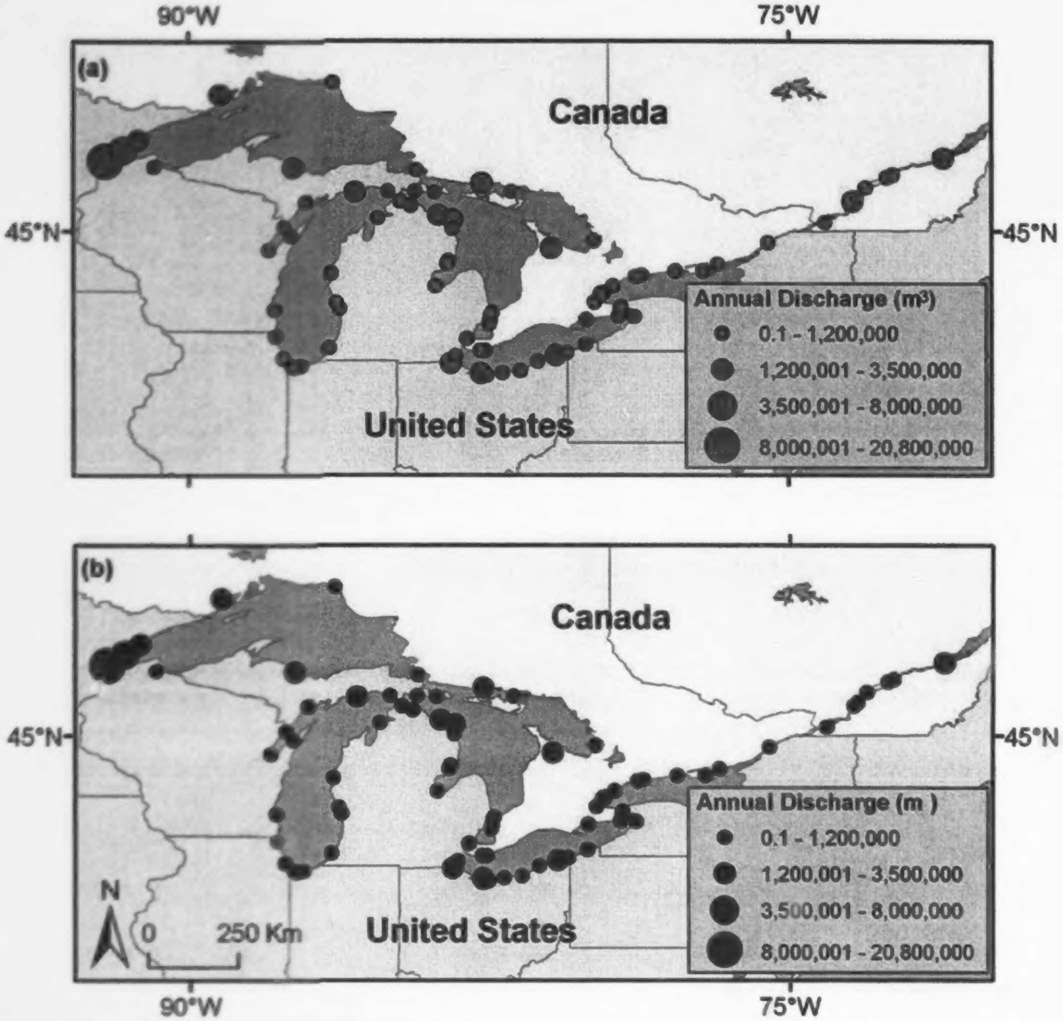

90°W
75°W
45°N
(a)
Canada
United States
Annual Discharge (m³)
0.1 - 1,200,000
1,200,001 - 3,500,000
3,500,001 - 8,000,000
8,000,001 - 20,800,000
(b)
Canada
United States
Annual Discharge (m )
0.1 - 1,200,000
1,200,001 - 3,500,000
3,500,001 - 8,000,000
8,000,001 - 20,800,000
N
0
250 Km
90°W
75°W

*Figure 8. Map illustrating spatial patterns of (a) annual ballast water discharges and (b) combination of direct and foreign exchanged (with correction factor applied) ballast water discharges in the GLSLR region. Lakes are, from left to right, Superior, Michigan, Huron, Erie, and Ontario.*

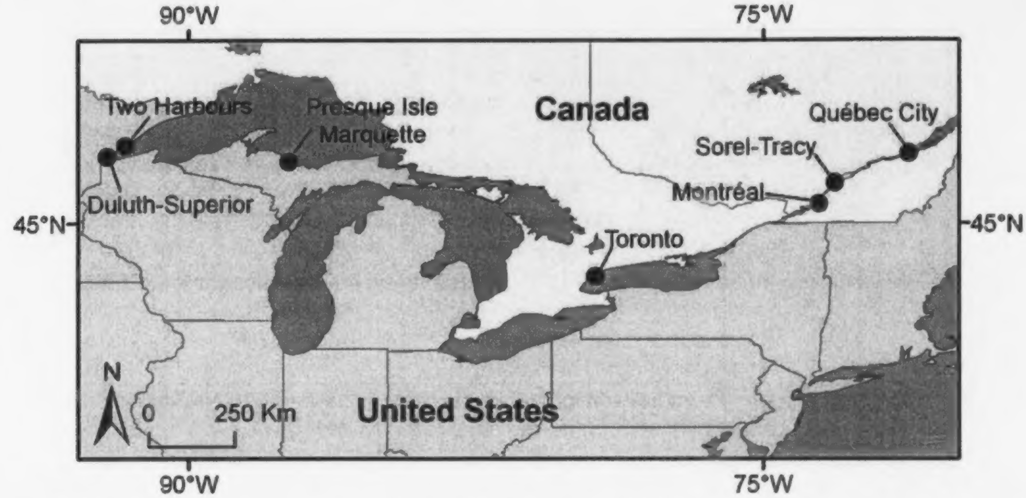

90°W
75°W
Two Harbours
Presque Isle
Marquette
Canada
Québec City
Sorel-Tracy
Montréal
Duluth-Superior
45°N
Toronto
45°N
N
0
250 Km
United States
90°W
75°W

*Figure 9. Map illustrating locations of all top GLSLR ports based on the annual volume of ballast water discharged by all merchant vessels; correction factors were applied to account for reduction in propagule supply due to ballast water exchange.*

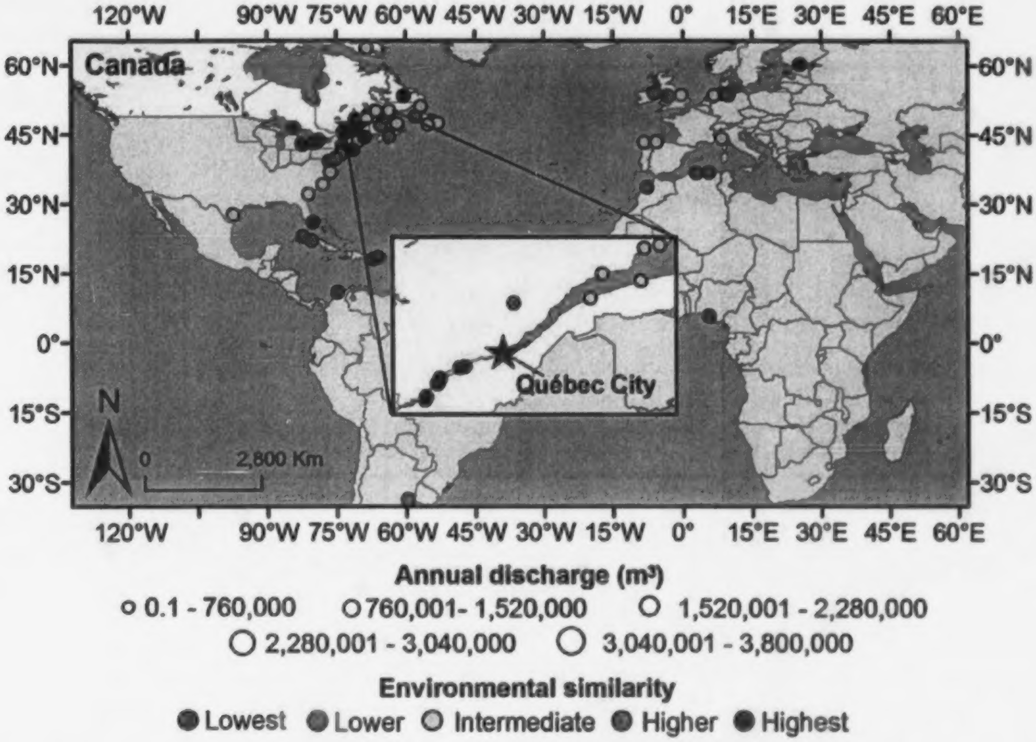

120°W
90°W 75°W 60°W 45°W 30°W 15°W 0° 15°E 30°E 45°E 60°E
60°N
45°N
30°N
15°N
0°
15°S
30°S
Canada
Québec City
N
0
2,800 Km
Annual discharge (m³)
○ 0.1 - 760,000
○ 760,001- 1,520,000
○ 1,520,001 - 2,280,000
○ 2,280,001 - 3,040,000
○ 3,040,001 - 3,800,000
Environmental similarity
● Lowest
● Lower
○ Intermediate
● Higher
● Highest

*Figure 10. Map illustrating propagule supply and environmental similarity between Québec City and source ports connected via international merchant vessel ballast water discharges.*

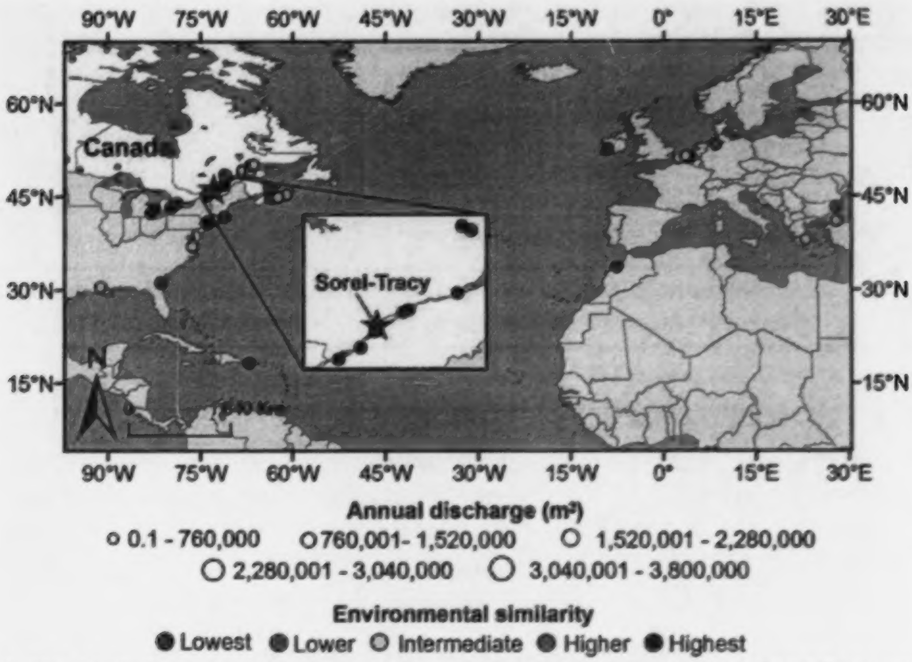

90°W 75°W 60°W 45°W 30°W 15°W 0° 15°E 30°E
60°N
45°N
30°N
15°N
Canada
Sorel-Tracy
N
540 Km
Annual discharge (m³)
○ 0.1 - 760,000
○ 760,001- 1,520,000
○ 1,520,001 - 2,280,000
○ 2,280,001 - 3,040,000
○ 3,040,001 - 3,800,000
Environmental similarity
● Lowest
● Lower
○ Intermediate
● Higher
● Highest

*Figure 11. Map illustrating propagule supply and environmental similarity between Sorel-Tracy and source ports connected via international merchant vessel ballast water discharges.*

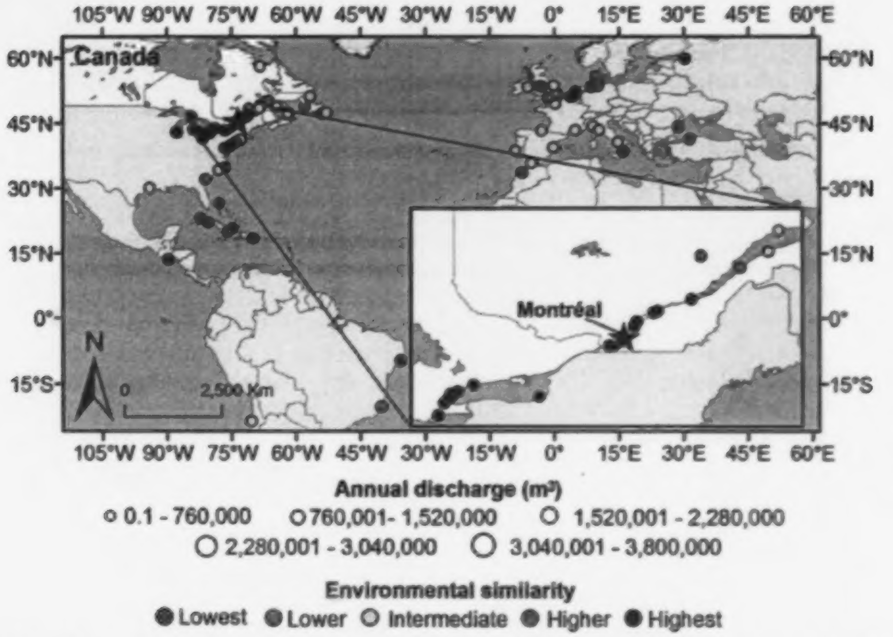

105°W 90°W 75°W 60°W 45°W 30°W 15°W 0° 15°E 30°E 45°E 60°E
60°N
45°N
30°N
15°N
0°
15°S
Canada
Montréal
N
0
2,500 Km
Annual discharge (m³)
○ 0.1 - 760,000
○ 760,001- 1,520,000
○ 1,520,001 - 2,280,000
○ 2,280,001 - 3,040,000
○ 3,040,001 - 3,800,000
Environmental similarity
● Lowest
● Lower
○ Intermediate
● Higher
● Highest

*Figure 12. Map illustrating propagule supply and environmental similarity between Montréal and source ports connected via international merchant vessel ballast water discharges.*

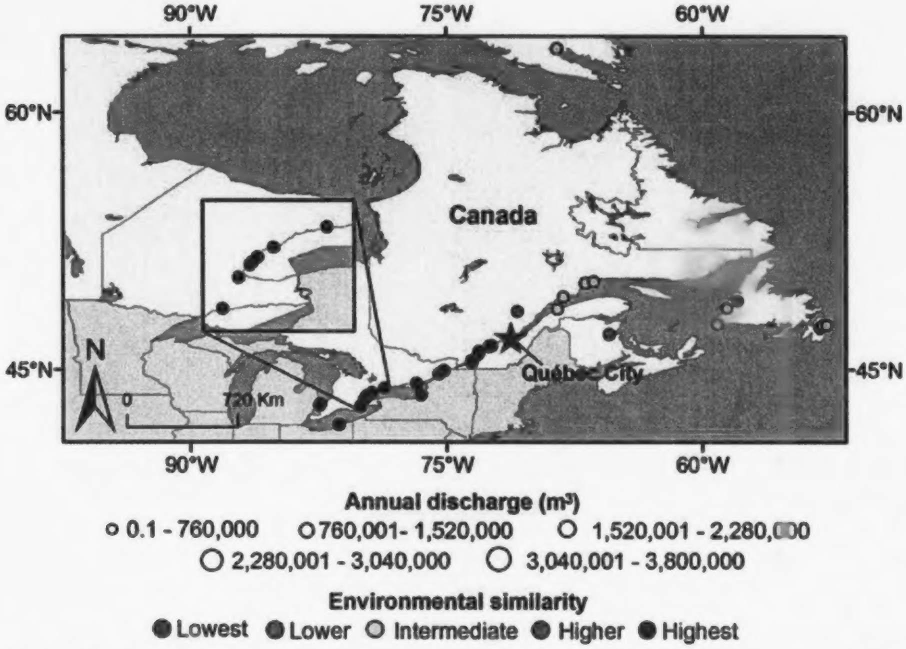

90°W
75°W
60°W
60°N
45°N
Canada
N
0
720 Km
Québec City
Annual discharge (m³)
○ 0.1 - 760,000
○ 760,001- 1,520,000
○ 1,520,001 - 2,280,000
○ 2,280,001 - 3,040,000
○ 3,040,001 - 3,800,000
Environmental similarity
● Lowest
● Lower
○ Intermediate
● Higher
● Highest

*Figure 13. Map illustrating propagule supply and environmental similarity between Québec City and source ports connected via coastal domestic merchant vessel ballast water discharges.*

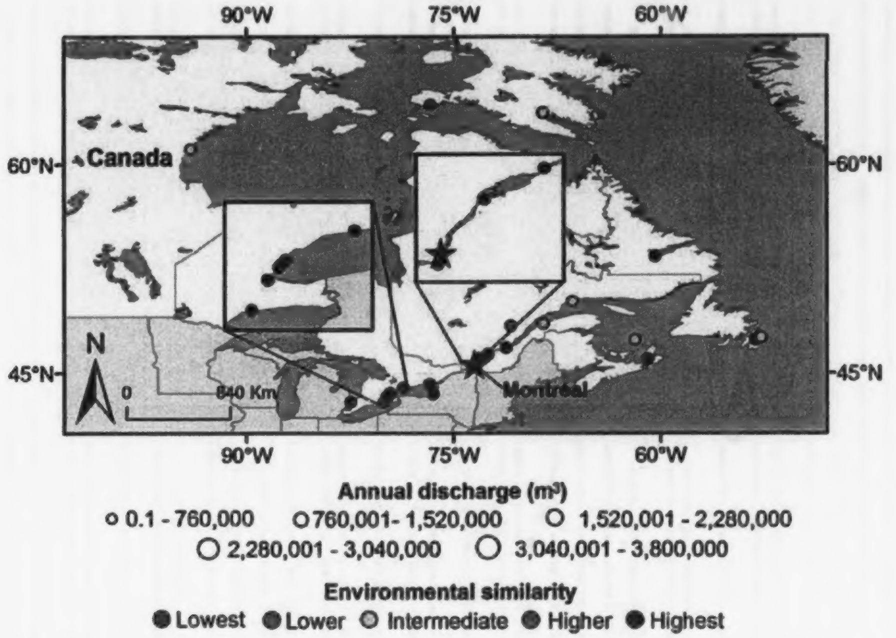

90°W
75°W
60°W
60°N
45°N
Canada
Montréal
N
0
840 Km
Annual discharge (m³)
○ 0.1 - 760,000
○ 760,001- 1,520,000
○ 1,520,001 - 2,280,000
○ 2,280,001 - 3,040,000
○ 3,040,001 - 3,800,000
Environmental similarity
● Lowest
● Lower
◎ Intermediate
● Higher
● Highest

*Figure 14. Map illustrating propagule supply and environmental similarity between Montréal and source ports connected via coastal domestic merchant vessel ballast water discharges.*

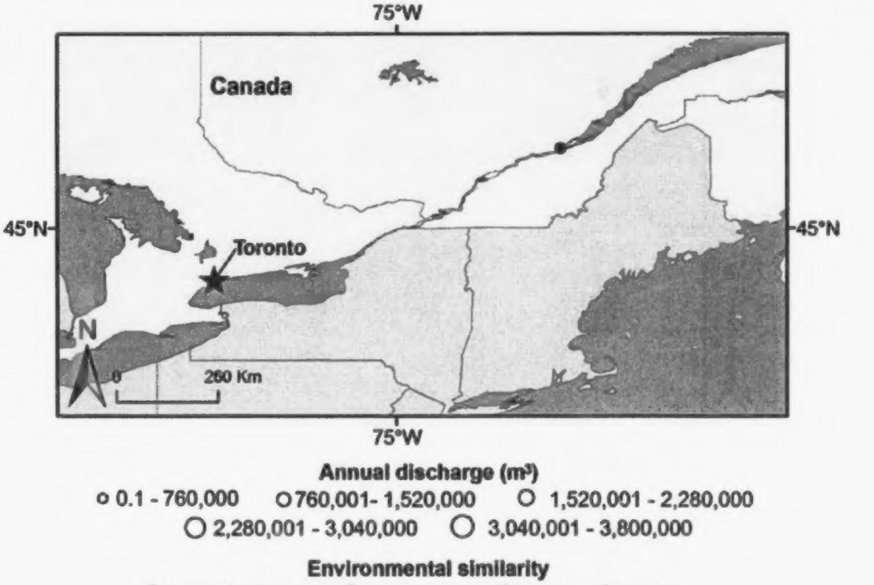

75°W
45°N
Canada
Toronto
N
0
260 Km
Annual discharge (m³)
○ 0.1 - 760,000
○ 760,001- 1,520,000
○ 1,520,001 - 2,280,000
○ 2,280,001 - 3,040,000
○ 3,040,001 - 3,800,000
Environmental similarity
● Lowest
● Lower
○ Intermediate
● Higher
● Highest

*Figure 15. Map illustrating propagule supply and environmental similarity between Toronto and source ports connected via coastal domestic merchant vessel ballast water discharges.*

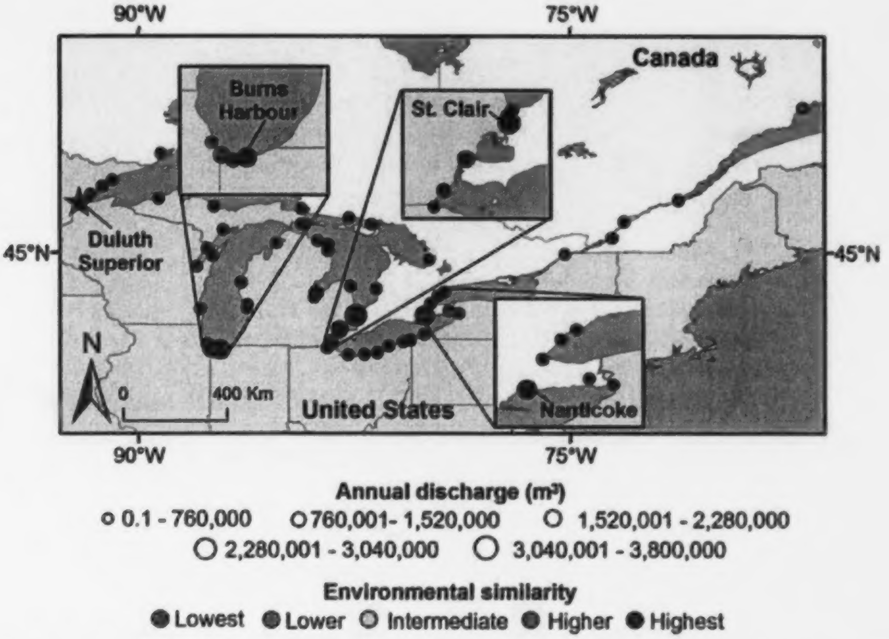

90°W
75°W
Canada
Burns Harbour
St. Clair
Duluth Superior
45°N
45°N
N
0
400 Km
United States
Nanticoke
90°W
75°W
Annual discharge (m³)
○ 0.1 - 760,000
○ 760,001- 1,520,000
○ 1,520,001 - 2,280,000
○ 2,280,001 - 3,040,000
○ 3,040,001 - 3,800,000
Environmental similarity
● Lowest
● Lower
○ Intermediate
● Higher
● Highest

*Figure 16. Map illustrating propagule supply and environmental similarity between Duluth-Superior and source ports connected via Laker merchant vessel ballast water discharges.*

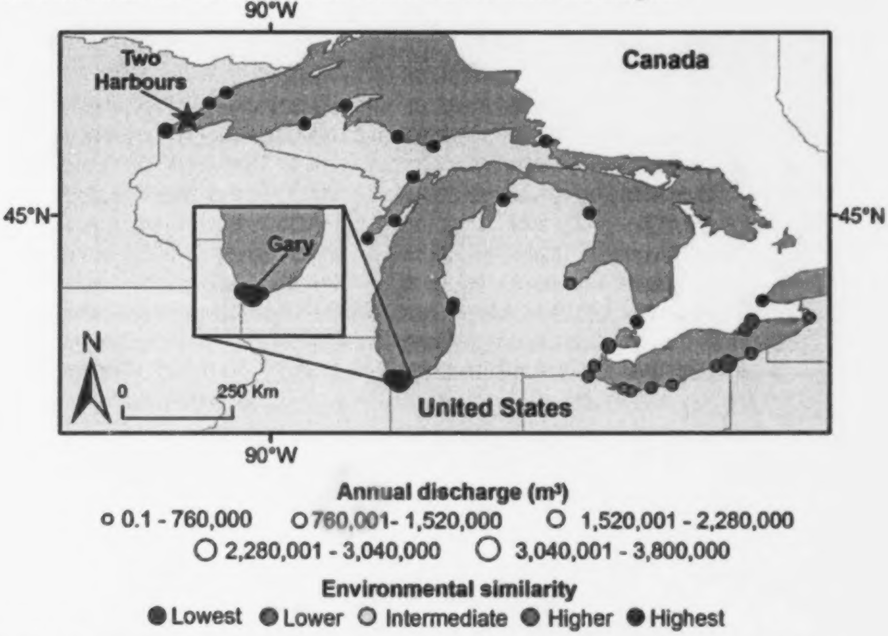

90°W
Two Harbours
Canada
45°N
45°N
Gary
N
0
250 Km
United States
90°W
Annual discharge (m³)
○ 0.1 - 760,000
○ 760,001- 1,520,000
○ 1,520,001 - 2,280,000
○ 2,280,001 - 3,040,000
○ 3,040,001 - 3,800,000
Environmental similarity
● Lowest
● Lower
○ Intermediate
● Higher
● Highest

*Figure 17. Map illustrating propagule supply and environmental similarity between Two Harbors and connected source ports via Laker merchant vessel ballast water discharges.*

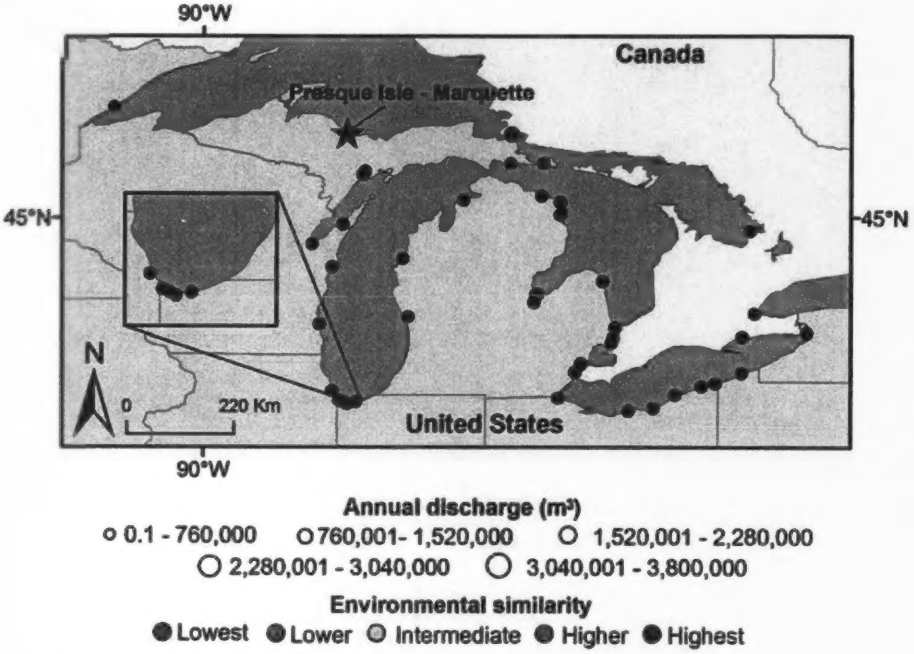

90°W
Canada
Presque Isle - Marquette
45°N
45°N
N
0
220 Km
United States
90°W
Annual discharge (m³)
○ 0.1 - 760,000
○ 760,001 - 1,520,000
○ 1,520,001 - 2,280,000
○ 2,280,001 - 3,040,000
○ 3,040,001 - 3,800,000
Environmental similarity
● Lowest
● Lower
● Intermediate
● Higher
● Highest

*Figure 18. Map illustrating propagule supply and environmental similarity between Presque Isle-Marquette and connected source ports via Laker merchant vessel ballast water discharges.*

# APPENDICES

Appendix A. List of global ports that have highest environmental similarity to Quebéc City. NIS originating from these ports have the highest potential for survival if introduced at Québec City.

| Name | Country | Latitude | Longitude | Environmental Distance |
|---|---|---|---|---|
| Eckero | ALD | 60.22 | 19.60 | 0.77 |
| Farjsundet | ALD | 60.23 | 20.02 | 1.02 |
| Finstrom | ALD | 60.25 | 19.92 | 1.02 |
| Langnasudd | ALD | 60.12 | 20.30 | 1.04 |
| Mariehamn | ALD | 60.10 | 19.93 | 1.08 |
| Korneuburg | AUT | 48.37 | 16.33 | 0.68 |
| Linz | AUT | 48.32 | 14.30 | 0.56 |
| Vienna | AUT | 48.22 | 16.37 | 0.75 |
| Antwerp | BEL | 51.24 | 4.41 | 0.90 |
| Baasrode | BEL | 51.05 | 4.17 | 0.92 |
| Balen | BEL | 51.17 | 5.17 | 0.87 |
| Boom | BEL | 51.08 | 4.37 | 0.89 |
| Brussels | BEL | 50.83 | 4.32 | 0.89 |
| Buggenhout | BEL | 51.02 | 4.20 | 0.91 |
| Burcht | BEL | 51.20 | 4.33 | 0.92 |
| Chatelineau | BEL | 50.42 | 4.52 | 0.83 |
| Dendermonde | BEL | 51.03 | 4.12 | 0.92 |
| Doel | BEL | 51.32 | 4.27 | 0.93 |
| Engis | BEL | 50.58 | 5.40 | 0.81 |
| Ertvelde | BEL | 51.20 | 3.78 | 0.96 |
| Geel | BEL | 51.15 | 4.97 | 0.87 |
| Genk | BEL | 50.94 | 5.50 | 0.86 |
| Ghent | BEL | 51.09 | 3.75 | 0.94 |
| Grimbergen | BEL | 50.93 | 4.37 | 0.88 |
| Grobbendonk | BEL | 51.20 | 4.75 | 0.88 |
| Haren | BEL | 50.90 | 4.38 | 0.88 |
| Hemiksem | BEL | 51.15 | 4.34 | 0.89 |
| Hermalle sous Huy | BEL | 50.55 | 5.37 | 0.81 |
| Hingene | BEL | 51.12 | 4.27 | 0.91 |
| Hoboken | BEL | 51.17 | 4.33 | 0.91 |
| Humbeek | BEL | 50.97 | 4.38 | 0.88 |
| Kallo | BEL | 51.25 | 4.28 | 0.92 |
| Kapelle op den Bos | BEL | 51.02 | 4.37 | 0.89 |
| Kruibeke | BEL | 51.17 | 4.32 | 0.91 |
| Kwaadmechelen | BEL | 51.10 | 5.15 | 0.87 |
| Lanaken | BEL | 50.88 | 5.65 | 0.86 |
| Langerbrugge | BEL | 51.12 | 3.75 | 0.94 |
| Liefkenshoek | BEL | 51.30 | 4.28 | 0.93 |
| Liege | BEL | 50.64 | 5.57 | 0.82 |
| Lillo | BEL | 51.30 | 4.30 | 0.93 |
| Lixhe | BEL | 50.73 | 5.70 | 0.83 |
| Maasmechelen | BEL | 50.97 | 5.70 | 0.85 |
| Marly | BEL | 50.88 | 4.38 | 0.88 |
| Mechelen | BEL | 51.03 | 4.47 | 0.89 |

| | | | | |
|---|---|---|---|---|
| Melle | BEL | 51.00 | 3.80 | 0.91 |
| Merksem | BEL | 51.23 | 4.48 | 0.90 |
| Nameche | BEL | 50.47 | 4.98 | 0.82 |
| Niel | BEL | 51.12 | 4.33 | 0.91 |
| Olen | BEL | 51.15 | 4.87 | 0.87 |
| Puurs | BEL | 51.07 | 4.27 | 0.91 |
| Rieme | BEL | 51.17 | 3.77 | 0.95 |
| Ruisbroek | BEL | 50.78 | 4.28 | 0.89 |
| Rumst | BEL | 51.07 | 4.42 | 0.89 |
| Rupelmonde | BEL | 51.13 | 4.28 | 0.91 |
| Schelle | BEL | 51.13 | 4.32 | 0.91 |
| Schoten | BEL | 51.25 | 4.50 | 0.90 |
| Seilles | BEL | 50.50 | 5.08 | 0.80 |
| Sint-Kruis-Winkel | BEL | 51.15 | 3.80 | 0.95 |
| Temse | BEL | 51.13 | 4.22 | 0.91 |
| Terdonk | BEL | 51.15 | 3.78 | 0.95 |
| Terhagen | BEL | 51.08 | 4.38 | 0.89 |
| Tessenderlo | BEL | 51.07 | 5.08 | 0.87 |
| Tielrode | BEL | 51.12 | 4.22 | 0.91 |
| Tisselt | BEL | 51.03 | 4.37 | 0.89 |
| Val St. Lambert | BEL | 50.57 | 5.47 | 0.81 |
| Verbrande Brug | BEL | 50.95 | 4.38 | 0.88 |
| Vilvoorde | BEL | 50.95 | 4.42 | 0.88 |
| Willebroek | BEL | 51.05 | 4.35 | 0.89 |
| Wintham | BEL | 51.10 | 4.28 | 0.91 |
| Wondelgem | BEL | 51.08 | 3.72 | 0.94 |
| Zelzate | BEL | 51.20 | 3.80 | 0.96 |
| Zutendaal | BEL | 50.92 | 5.57 | 0.86 |
| Zwyndrecht | BEL | 51.22 | 4.33 | 0.92 |
| Kozloduy | BGR | 43.78 | 23.72 | 1.05 |
| Lom | BGR | 43.83 | 23.20 | 0.97 |
| Rousse | BGR | 43.83 | 25.97 | 0.97 |
| Silistra | BGR | 44.10 | 27.25 | 0.97 |
| Amherstburg | CAN | 42.10 | -83.08 | 0.72 |
| Baddeck | CAN | 46.10 | -60.73 | 0.80 |
| Bath | CAN | 44.17 | -76.77 | 0.40 |
| Batiscan | CAN | 46.52 | -72.23 | 0.06 |
| Bayside | CAN | 45.17 | -67.13 | 0.84 |
| Becancour | CAN | 46.40 | -72.38 | 0.02 |
| Bella Coola | CAN | 52.38 | -126.77 | 1.08 |
| Belleville | CAN | 44.13 | -77.37 | 0.34 |
| Bowmanville | CAN | 43.90 | -78.67 | 0.30 |
| Boylston | CAN | 45.45 | -61.52 | 0.95 |
| Britt | CAN | 45.77 | -80.58 | 0.32 |
| Brockville | CAN | 44.60 | -75.63 | 0.34 |
| Bronte | CAN | 43.40 | -79.70 | 0.34 |
| Bruce Mines | CAN | 46.27 | -83.72 | 0.50 |
| Burlington | CAN | 43.32 | -79.75 | 0.37 |
| Cardinal | CAN | 44.78 | -75.33 | 0.36 |
| Chicoutimi | CAN | 48.43 | -71.08 | 0.21 |

| | | | | |
|---|---|---|---|---|
| Clarkson | CAN | 43.50 | -79.60 | 0.34 |
| Cobourg | CAN | 43.95 | -78.17 | 0.32 |
| Colborne | CAN | 44.00 | -77.88 | 0.32 |
| Collingwood | CAN | 44.50 | -80.23 | 0.33 |
| Contrecœur | CAN | 45.88 | -73.20 | 0.17 |
| Cornwall | CAN | 45.02 | -74.72 | 0.31 |
| Corunna | CAN | 42.88 | -82.45 | 0.40 |
| Côte Ste-Catherine | CAN | 45.41 | -73.58 | 0.31 |
| Country Harbour | CAN | 45.22 | -61.73 | 0.98 |
| Courtright | CAN | 42.80 | -82.45 | 0.40 |
| Erieau | CAN | 42.25 | -81.93 | 0.64 |
| Fort Erie | CAN | 42.93 | -78.95 | 0.61 |
| Fredericton | CAN | 45.95 | -66.65 | 0.10 |
| Gananoque | CAN | 44.32 | -76.15 | 0.46 |
| Goderich | CAN | 43.75 | -81.75 | 0.38 |
| Gold River | CAN | 49.68 | -126.12 | 0.97 |
| Goose Bay | CAN | 53.35 | -60.42 | 0.86 |
| Grondines | CAN | 46.75 | -72.03 | 0.18 |
| Hamilton | CAN | 43.23 | -79.85 | 0.37 |
| Hay River | CAN | 60.85 | -115.70 | 0.87 |
| Houston | CAN | 54.40 | -126.65 | 0.99 |
| Humberstone | CAN | 42.90 | -79.25 | 0.58 |
| Iona | CAN | 45.97 | -60.80 | 0.44 |
| Isaac's Harbour | CAN | 45.17 | -61.65 | 1.07 |
| Killarney | CAN | 45.97 | -81.52 | 0.41 |
| Kingston | CAN | 44.20 | -76.50 | 0.45 |
| Kingsville | CAN | 42.02 | -82.72 | 0.74 |
| Kitimat | CAN | 54.00 | -128.70 | 0.75 |
| Lanoraie | CAN | 45.97 | -73.18 | 0.17 |
| Lauzon | CAN | 46.82 | -71.15 | 0.09 |
| Leamington | CAN | 42.05 | -82.62 | 0.75 |
| Levis | CAN | 46.82 | -71.18 | 0.00 |
| Little Current | CAN | 45.97 | -81.92 | 0.26 |
| Little Narrows | CAN | 45.98 | -60.98 | 0.39 |
| Long Sault | CAN | 45.02 | -74.90 | 0.24 |
| Marathon | CAN | 48.75 | -86.38 | 0.99 |
| Meldrum Bay | CAN | 45.92 | -83.10 | 0.46 |
| Michipicoten Harbour | CAN | 47.95 | -84.92 | 0.69 |
| Midland | CAN | 44.75 | -79.93 | 0.31 |
| Montréal | CAN | 45.50 | -73.55 | 0.34 |
| Mooretown | CAN | 42.85 | -82.47 | 0.39 |
| Morrisburg | CAN | 44.93 | -75.18 | 0.23 |
| Nanticoke | CAN | 42.82 | -80.07 | 0.52 |
| Nelson | CAN | 49.47 | -117.30 | 0.85 |
| Oakville | CAN | 43.43 | -79.67 | 0.34 |
| Ocean Falls | CAN | 52.35 | -127.70 | 1.03 |
| Oshawa | CAN | 43.87 | -78.83 | 0.32 |
| Ottawa | CAN | 45.40 | -75.70 | 0.22 |
| Owen Sound | CAN | 44.58 | -80.95 | 0.31 |
| Parry Sound | CAN | 45.37 | -80.05 | 0.29 |

| | | | | |
|---|---|---|---|---|
| Pelee Island | CAN | 41.75 | -82.67 | 0.79 |
| Picton | CAN | 44.00 | -77.13 | 0.41 |
| Pointe-aux-Trembles | CAN | 45.63 | -73.48 | 0.26 |
| Port Alberni | CAN | 49.23 | -125.00 | 0.92 |
| Port Burwell | CAN | 42.63 | -80.80 | 0.53 |
| Port Colborne | CAN | 42.87 | -79.25 | 0.59 |
| Port Credit | CAN | 43.55 | -79.60 | 0.31 |
| Port Dalhousie | CAN | 43.20 | -79.27 | 0.41 |
| Port Dover | CAN | 42.78 | -80.20 | 0.49 |
| Port Hope | CAN | 43.95 | -78.28 | 0.31 |
| Port Maitland | CAN | 42.87 | -79.58 | 0.55 |
| Port McNicoll | CAN | 44.75 | -79.80 | 0.32 |
| Port Stanley | CAN | 42.67 | -81.22 | 0.52 |
| Port Weller | CAN | 43.23 | -79.22 | 0.44 |
| Prescott | CAN | 44.72 | -75.52 | 0.31 |
| Québec | CAN | 46.82 | -71.20 | 0.00 |
| Sarnia | CAN | 42.98 | -82.42 | 0.38 |
| Sault Ste. Marie | CAN | 46.52 | -84.33 | 0.43 |
| Sombra | CAN | 42.70 | -82.47 | 0.41 |
| Sonora | CAN | 45.07 | -61.92 | 1.01 |
| Sorel | CAN | 46.05 | -73.12 | 0.19 |
| Spragge | CAN | 46.22 | -82.67 | 0.30 |
| St. Catharines | CAN | 43.17 | -79.27 | 0.39 |
| St. Romuald | CAN | 46.75 | -71.23 | 0.00 |
| St. Stephen | CAN | 45.20 | -67.28 | 0.43 |
| Ste. Croix | CAN | 46.63 | -71.73 | 0.07 |
| Thessalon | CAN | 46.25 | -83.55 | 0.49 |
| Thorold | CAN | 43.08 | -79.17 | 0.55 |
| Three Rivers | CAN | 46.35 | -72.55 | 0.04 |
| Thunder Bay | CAN | 48.42 | -89.22 | 0.85 |
| Tobermory | CAN | 45.23 | -81.65 | 0.45 |
| Toronto | CAN | 43.63 | -79.38 | 0.31 |
| Tracy | CAN | 46.02 | -73.17 | 0.14 |
| Valleyfield | CAN | 45.22 | -74.08 | 0.29 |
| Wallaceburg | CAN | 42.60 | -82.40 | 0.40 |
| Welland | CAN | 42.97 | -79.22 | 0.52 |
| Weymouth | CAN | 44.45 | -66.02 | 0.88 |
| Wheatley | CAN | 42.08 | -82.43 | 0.65 |
| Whitby | CAN | 43.85 | -78.92 | 0.31 |
| Windsor | CAN | 42.32 | -83.05 | 0.50 |
| Basle | CHE | 47.55 | 7.57 | 0.72 |
| Dandong | CHN | 40.13 | 124.40 | 1.05 |
| Fujin | CHN | 47.25 | 132.02 | 0.43 |
| Harbin | CHN | 45.73 | 126.60 | 0.51 |
| Heihe | CHN | 50.23 | 127.47 | 0.45 |
| Jiamusi | CHN | 46.80 | 130.35 | 0.42 |
| Panjin | CHN | 41.12 | 122.07 | 0.96 |
| Panshi | CHN | 42.92 | 126.03 | 0.44 |
| Tongjiang | CHN | 47.63 | 132.50 | 0.43 |
| Chvaletice | CZE | 50.02 | 15.43 | 0.57 |

| | | | | |
|---|---|---|---|---|
| Ústí nad Labem | CZE | 50.67 | 14.03 | 0.55 |
| Aken | DEU | 51.85 | 12.03 | 0.66 |
| Andernach | DEU | 50.42 | 7.38 | 0.78 |
| Anklam | DEU | 53.87 | 13.68 | 0.84 |
| Aschaffenburg | DEU | 49.95 | 9.17 | 0.69 |
| Barth | DEU | 54.37 | 12.73 | 0.87 |
| Bendorf | DEU | 50.42 | 7.58 | 0.76 |
| Berlin | DEU | 52.53 | 13.42 | 0.64 |
| Berne | DEU | 53.18 | 10.50 | 0.73 |
| Bingen | DEU | 49.95 | 7.90 | 0.75 |
| Bodenwerder | DEU | 51.97 | 9.50 | 0.72 |
| Boizenburg | DEU | 53.38 | 10.73 | 0.73 |
| Bonn | DEU | 50.72 | 7.08 | 0.84 |
| Brandenburg | DEU | 52.40 | 12.52 | 0.66 |
| Braunschweig | DEU | 52.25 | 10.50 | 0.72 |
| Brohl | DEU | 50.42 | 7.30 | 0.74 |
| Castrop Rauxel | DEU | 51.55 | 7.30 | 0.84 |
| Cologne | DEU | 50.93 | 7.00 | 0.86 |
| Deggendorf | DEU | 48.83 | 12.97 | 0.58 |
| Dormagen | DEU | 51.10 | 6.95 | 0.87 |
| Dortmund | DEU | 51.53 | 7.45 | 0.83 |
| Duisburg | DEU | 51.43 | 6.75 | 0.87 |
| Dusseldorf | DEU | 51.25 | 6.77 | 0.87 |
| Eisenhuttenstadt | DEU | 52.15 | 14.62 | 0.55 |
| Emmerich | DEU | 51.85 | 6.25 | 0.86 |
| Erftstadt | DEU | 50.80 | 6.75 | 0.82 |
| Essen | DEU | 51.45 | 7.02 | 0.84 |
| Frankfurt | DEU | 50.12 | 8.67 | 0.71 |
| Geesthacht | DEU | 53.43 | 10.38 | 0.73 |
| Gelsenkirchen | DEU | 51.50 | 7.08 | 0.84 |
| Germersheim | DEU | 49.22 | 8.38 | 0.82 |
| Gernsheim | DEU | 49.75 | 8.47 | 0.77 |
| Greifswald | DEU | 54.10 | 13.38 | 0.88 |
| Haren | DEU | 52.80 | 7.25 | 0.89 |
| Havelberg | DEU | 52.83 | 12.07 | 0.67 |
| Heringsdorf | DEU | 53.97 | 14.17 | 0.83 |
| Hohenhorn | DEU | 53.47 | 10.37 | 0.73 |
| Hömberg | DEU | 51.45 | 6.72 | 0.87 |
| Hoya | DEU | 52.80 | 9.13 | 0.75 |
| Ibbenburen | DEU | 52.28 | 7.73 | 0.80 |
| Karlsruhe | DEU | 49.05 | 8.33 | 0.83 |
| Kehl | DEU | 48.58 | 7.83 | 0.80 |
| Koblenz | DEU | 50.33 | 7.58 | 0.73 |
| Krefeld | DEU | 51.33 | 6.57 | 0.87 |
| Kroslin | DEU | 54.13 | 13.75 | 0.91 |
| Ladebow | DEU | 54.10 | 13.45 | 0.88 |
| Lahnstein | DEU | 50.30 | 7.62 | 0.73 |
| Lauenburg | DEU | 53.38 | 10.55 | 0.73 |
| Lauterbach | DEU | 54.33 | 13.52 | 0.93 |
| Leer | DEU | 53.22 | 7.45 | 0.90 |

| | | | | |
|---|---|---|---|---|
| Leeseringen | DEU | 52.58 | 9.13 | 0.75 |
| Leverkusen | DEU | 51.02 | 7.03 | 0.82 |
| Lubmin | DEU | 54.12 | 13.60 | 0.86 |
| Ludwigshafen am Rhein | DEU | 49.47 | 8.45 | 0.81 |
| Magdeburg | DEU | 52.13 | 11.62 | 0.65 |
| Mainz | DEU | 50.00 | 8.28 | 0.73 |
| Mannheim | DEU | 49.48 | 8.47 | 0.81 |
| Minden | DEU | 52.30 | 8.90 | 0.75 |
| Monheim | DEU | 51.12 | 6.82 | 0.87 |
| Moselkern | DEU | 50.18 | 7.37 | 0.74 |
| Mukran | DEU | 54.48 | 13.58 | 0.96 |
| Mulheim | DEU | 50.95 | 7.05 | 0.84 |
| Neckarsteinach | DEU | 49.43 | 8.80 | 0.68 |
| Neuss | DEU | 51.20 | 6.70 | 0.87 |
| Neuss/Dusseldorf | DEU | 51.20 | 6.70 | 0.87 |
| Neuwied | DEU | 50.43 | 7.48 | 0.78 |
| Nienburg | DEU | 52.63 | 9.22 | 0.75 |
| Nuremberg | DEU | 49.45 | 11.05 | 0.60 |
| Orsoy | DEU | 51.53 | 6.68 | 0.87 |
| Osnabruck | DEU | 52.27 | 8.03 | 0.77 |
| Papenburg | DEU | 53.08 | 7.38 | 0.84 |
| Passau | DEU | 48.58 | 13.47 | 0.57 |
| Peenemunde | DEU | 54.12 | 13.77 | 0.91 |
| Peine | DEU | 52.32 | 10.22 | 0.72 |
| Porz | DEU | 50.88 | 7.05 | 0.84 |
| Regensburg | DEU | 49.02 | 12.12 | 0.55 |
| Remagen | DEU | 50.57 | 7.22 | 0.78 |
| Rheinhausen | DEU | 51.42 | 6.73 | 0.87 |
| Rinteln | DEU | 52.20 | 9.08 | 0.74 |
| Rosslau | DEU | 51.90 | 12.27 | 0.66 |
| Rostock | DEU | 54.15 | 12.10 | 0.90 |
| Ruhrort | DEU | 51.45 | 6.73 | 0.87 |
| Salzgitter | DEU | 52.22 | 10.33 | 0.72 |
| Sassnitz | DEU | 54.52 | 13.63 | 0.96 |
| Speyer | DEU | 49.30 | 8.43 | 0.82 |
| Stralsund | DEU | 54.32 | 13.10 | 0.89 |
| Sturzelberg | DEU | 51.12 | 6.80 | 0.87 |
| Stuttgart | DEU | 48.78 | 9.20 | 0.69 |
| Tangermunde | DEU | 52.57 | 11.97 | 0.67 |
| Ueckermunde | DEU | 53.73 | 14.28 | 0.88 |
| Urdingen | DEU | 51.35 | 6.67 | 0.87 |
| Vallendar | DEU | 50.40 | 7.62 | 0.76 |
| Vierow | DEU | 54.10 | 13.57 | 0.86 |
| Walsum | DEU | 51.53 | 6.68 | 0.87 |
| Warnemunde | DEU | 54.18 | 12.08 | 0.93 |
| Weissenthurm | DEU | 50.42 | 7.48 | 0.78 |
| Wesel | DEU | 51.65 | 6.60 | 0.87 |
| Wesseling | DEU | 50.83 | 7.00 | 0.82 |
| Wolgast | DEU | 54.05 | 13.78 | 0.91 |
| Worms | DEU | 49.63 | 8.35 | 0.79 |

|  |  |  |  |  |
|---|---|---|---|---|
| Wurzburg | DEU | 49.78 | 9.93 | 0.63 |
| Aggersund | DNK | 57.02 | 9.28 | 1.02 |
| Allinge | DNK | 55.28 | 14.80 | 1.02 |
| Fur | DNK | 56.83 | 9.00 | 1.01 |
| Gudhjem | DNK | 55.22 | 14.97 | 0.90 |
| Hammeren | DNK | 55.28 | 14.75 | 1.02 |
| Hammerhavn | DNK | 55.27 | 14.75 | 1.02 |
| Hasle | DNK | 55.18 | 14.70 | 1.01 |
| Hvalpsund | DNK | 56.68 | 9.20 | 0.79 |
| Logstor | DNK | 56.97 | 9.25 | 0.79 |
| Nekso | DNK | 55.07 | 15.15 | 0.93 |
| Nykobing | DNK | 56.80 | 8.87 | 0.99 |
| Ronne | DNK | 55.10 | 14.70 | 1.01 |
| Skarrehage | DNK | 56.95 | 8.87 | 0.96 |
| Skive | DNK | 56.57 | 9.03 | 0.80 |
| Stege | DNK | 54.98 | 12.28 | 0.99 |
| Stubbekobing | DNK | 54.88 | 12.03 | 0.92 |
| Svaneke | DNK | 55.13 | 15.15 | 0.93 |
| Tejn | DNK | 55.23 | 14.83 | 1.02 |
| Thisted | DNK | 56.95 | 8.70 | 0.86 |
| Vang | DNK | 55.27 | 14.75 | 1.02 |
| Bekker | EST | 59.45 | 24.67 | 0.65 |
| Dirhami | EST | 59.22 | 23.50 | 0.89 |
| Forby | EST | 59.00 | 23.17 | 0.86 |
| Haapsalu | EST | 58.95 | 23.53 | 0.66 |
| Heltermaa | EST | 58.87 | 23.07 | 0.75 |
| Kuivastu | EST | 58.58 | 23.40 | 0.73 |
| Kunda | EST | 59.52 | 26.55 | 0.84 |
| Lehtma | EST | 59.05 | 22.70 | 0.93 |
| Loksa | EST | 59.58 | 25.72 | 0.85 |
| Meeruse | EST | 59.45 | 24.68 | 0.64 |
| Miiduranna | EST | 59.50 | 24.82 | 0.92 |
| Montu | EST | 57.95 | 22.12 | 0.78 |
| Muuga | EST | 59.50 | 24.97 | 0.92 |
| Narva Joesuu | EST | 59.47 | 28.05 | 0.58 |
| Paldiski | EST | 59.35 | 24.05 | 0.92 |
| Paljassaare | EST | 59.45 | 24.70 | 0.64 |
| Parnu | EST | 58.38 | 24.48 | 0.59 |
| Peetri | EST | 59.45 | 24.73 | 0.64 |
| Prangli Island | EST | 59.63 | 25.00 | 0.86 |
| Rohukula | EST | 58.90 | 23.42 | 0.75 |
| Roomassaare | EST | 58.22 | 22.52 | 0.73 |
| Saaremaa Harbour | EST | 58.53 | 22.23 | 0.78 |
| Sillamae | EST | 59.40 | 27.78 | 0.58 |
| Tallinn | EST | 59.45 | 24.75 | 0.64 |
| Veere | EST | 58.45 | 22.05 | 0.74 |
| Virtsu | EST | 58.58 | 23.55 | 0.66 |
| Dalsbruk | FIN | 60.03 | 22.52 | 0.68 |
| Frojdbole | FIN | 60.15 | 19.92 | 1.08 |
| Galtby | FIN | 60.18 | 21.58 | 0.96 |

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|---|---|---|---|---|
| Hamina | FIN | 60.57 | 27.18 | 0.54 |
| Hanko | FIN | 59.82 | 22.97 | 0.95 |
| Helsinki | FIN | 60.17 | 24.95 | 0.56 |
| Houtskar | FIN | 60.22 | 21.37 | 0.98 |
| Imatra | FIN | 61.17 | 28.83 | 0.41 |
| Inkoo | FIN | 60.05 | 24.02 | 0.72 |
| Isnas | FIN | 60.40 | 26.00 | 0.61 |
| Joensuu | FIN | 62.60 | 29.75 | 0.53 |
| Joutseno | FIN | 61.13 | 28.48 | 0.41 |
| Kantvik | FIN | 60.08 | 24.38 | 0.71 |
| Kaskinen | FIN | 62.38 | 21.22 | 1.09 |
| Kaukas | FIN | 61.07 | 28.22 | 0.41 |
| Kaukopaa | FIN | 61.25 | 28.87 | 0.45 |
| Kemi | FIN | 65.73 | 24.57 | 0.86 |
| Kokkila | FIN | 60.33 | 22.87 | 0.69 |
| Korpo | FIN | 60.15 | 21.55 | 0.96 |
| Kotka | FIN | 60.47 | 26.95 | 0.79 |
| Koverhar | FIN | 59.88 | 23.22 | 0.94 |
| Kristiinankaupunki | FIN | 62.27 | 21.32 | 0.68 |
| Kronvik | FIN | 63.05 | 21.52 | 0.72 |
| Kuopio | FIN | 62.85 | 27.50 | 0.49 |
| Kustavi | FIN | 60.57 | 21.33 | 0.73 |
| Kuuslahti | FIN | 63.12 | 27.75 | 0.46 |
| Lapaluoto | FIN | 64.67 | 24.42 | 0.80 |
| Lappeenranta | FIN | 61.07 | 28.25 | 0.41 |
| Lappohja | FIN | 59.90 | 23.27 | 0.95 |
| Lappvik | FIN | 59.90 | 23.27 | 0.95 |
| Lauritsala | FIN | 61.08 | 28.33 | 0.41 |
| Loviisa | FIN | 60.45 | 26.23 | 0.58 |
| Luvia | FIN | 61.33 | 21.57 | 0.71 |
| Mantyluoto | FIN | 61.58 | 21.50 | 0.69 |
| Martinniemi | FIN | 65.22 | 25.28 | 0.77 |
| Maxmo | FIN | 63.20 | 22.03 | 0.75 |
| Merikarvia | FIN | 61.85 | 21.47 | 0.73 |
| Mjosund | FIN | 60.22 | 22.47 | 0.66 |
| Mustola | FIN | 61.07 | 28.30 | 0.41 |
| Naantali | FIN | 60.47 | 22.02 | 0.66 |
| Nyhamn | FIN | 62.17 | 21.33 | 0.68 |
| Olkiluoto | FIN | 61.25 | 21.50 | 0.70 |
| Oulu | FIN | 65.00 | 25.47 | 0.73 |
| Parainen | FIN | 60.28 | 22.30 | 0.67 |
| Pateniemi | FIN | 65.08 | 25.40 | 0.75 |
| Perno | FIN | 60.45 | 26.05 | 0.60 |
| Pori | FIN | 61.48 | 21.80 | 0.72 |
| Puhos | FIN | 62.10 | 29.92 | 0.50 |
| Raahe | FIN | 64.68 | 24.48 | 0.84 |
| Rahja | FIN | 64.20 | 23.73 | 0.81 |
| Rauma | FIN | 61.13 | 21.50 | 0.71 |
| Ristiina | FIN | 61.53 | 27.42 | 0.48 |
| Roytta | FIN | 65.77 | 24.15 | 0.87 |

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|---|---|---|---|---|
| Salo | FIN | 60.38 | 23.17 | 0.70 |
| Savonlinna | FIN | 61.90 | 28.92 | 0.46 |
| Siilinjarvi | FIN | 63.08 | 27.67 | 0.47 |
| Sipoo | FIN | 60.37 | 25.32 | 0.63 |
| Skogby | FIN | 59.92 | 23.32 | 0.95 |
| Skoldvik | FIN | 60.30 | 25.55 | 0.60 |
| Skuru | FIN | 60.10 | 23.55 | 0.70 |
| Stromma | FIN | 60.18 | 22.90 | 0.69 |
| Summa | FIN | 60.53 | 27.12 | 0.54 |
| Svartback | FIN | 60.28 | 25.53 | 0.60 |
| Taalintehdas | FIN | 60.02 | 22.52 | 0.68 |
| Tammisaari | FIN | 59.98 | 23.43 | 0.68 |
| Teijo | FIN | 60.25 | 22.95 | 0.69 |
| Tolkkinen | FIN | 60.33 | 25.58 | 0.60 |
| Tornio | FIN | 65.85 | 24.15 | 0.85 |
| Tupavuori | FIN | 60.45 | 22.07 | 0.66 |
| Turku | FIN | 60.43 | 22.22 | 0.65 |
| Uusikaupunki | FIN | 60.80 | 21.40 | 0.71 |
| Vaasa | FIN | 63.10 | 21.62 | 0.72 |
| Valkom | FIN | 60.42 | 26.27 | 0.58 |
| Varkaus | FIN | 62.33 | 27.83 | 0.45 |
| Vartsala | FIN | 60.33 | 23.02 | 0.70 |
| Vastanfjard | FIN | 60.05 | 22.65 | 0.68 |
| Veitsiluoto | FIN | 65.70 | 24.62 | 0.86 |
| Annay-sous-Lens | FRA | 50.47 | 2.87 | 0.94 |
| Bethune | FRA | 50.53 | 2.63 | 0.98 |
| Bonniéres | FRA | 49.03 | 1.58 | 0.98 |
| Chalon-sur-Saône | FRA | 46.78 | 4.83 | 0.89 |
| Conflans | FRA | 48.98 | 2.10 | 0.99 |
| Duclair | FRA | 49.45 | 0.87 | 1.04 |
| Elbeuf | FRA | 49.28 | 1.12 | 1.01 |
| Gaillon | FRA | 49.17 | 1.32 | 0.98 |
| Grand Couronne | FRA | 49.37 | 0.98 | 1.04 |
| Grigny | FRA | 45.62 | 4.78 | 0.96 |
| La Mailleraye | FRA | 49.48 | 0.77 | 1.04 |
| Le Trait | FRA | 49.47 | 0.80 | 1.04 |
| Les Andelys | FRA | 49.25 | 1.43 | 0.98 |
| Lille | FRA | 50.65 | 3.08 | 0.94 |
| Lille | FRA | 50.65 | 3.08 | 0.94 |
| Lillebonne | FRA | 49.52 | 0.53 | 1.06 |
| Limay | FRA | 48.97 | 1.78 | 0.96 |
| Lyon | FRA | 45.77 | 4.83 | 0.96 |
| Mantes | FRA | 48.98 | 1.72 | 0.96 |
| Paris | FRA | 48.87 | 2.33 | 1.04 |
| Petit Couronne | FRA | 49.37 | 1.00 | 1.04 |
| Port Jerome | FRA | 49.47 | 0.53 | 1.09 |
| Radicatel | FRA | 49.42 | 0.48 | 1.10 |
| Rouen | FRA | 49.48 | 1.08 | 1.02 |
| St. Etienne du Rouvray | FRA | 49.37 | 1.12 | 1.02 |
| St. Wandrille | FRA | 49.53 | 0.75 | 1.03 |

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|---|---|---|---|---|
| Strasbourg | FRA | 48.57 | 7.70 | 0.80 |
| Vernon | FRA | 49.08 | 1.48 | 0.98 |
| Villeneuve-la-Garenne | FRA | 48.92 | 2.30 | 1.04 |
| Villeneuve-le-Roi | FRA | 48.73 | 2.40 | 1.05 |
| Villequier | FRA | 49.50 | 0.67 | 1.06 |
| Althorpe Wharf | GBR | 53.57 | -0.73 | 1.03 |
| Anderton | GBR | 53.27 | -2.52 | 1.09 |
| Aylesford | GBR | 51.27 | 0.47 | 1.07 |
| Barton | GBR | 53.47 | -2.37 | 1.08 |
| Beckingham | GBR | 53.40 | -0.83 | 1.01 |
| Beverley | GBR | 53.85 | -0.43 | 1.09 |
| Burton upon Stather | GBR | 53.65 | -0.68 | 1.04 |
| Dalmuir | GBR | 55.90 | -4.43 | 1.10 |
| Drax | GBR | 53.73 | -0.98 | 1.02 |
| Flixborough | GBR | 53.62 | -0.68 | 1.03 |
| Gainsborough | GBR | 53.40 | -0.77 | 1.00 |
| Glasgow | GBR | 55.87 | -4.28 | 1.09 |
| Gloucester | GBR | 51.87 | -2.22 | 1.05 |
| Goole | GBR | 53.70 | -0.87 | 1.04 |
| Grove Wharf | GBR | 53.60 | -0.68 | 1.03 |
| Gunness | GBR | 53.58 | -0.72 | 1.03 |
| Gunness Wharf | GBR | 53.58 | -0.68 | 1.03 |
| Halling | GBR | 51.37 | 0.01 | 1.03 |
| Howdendyke | GBR | 53.75 | -0.87 | 1.04 |
| Irlam | GBR | 53.43 | -2.42 | 1.09 |
| Irwell | GBR | 53.47 | -2.35 | 1.08 |
| Keadby | GBR | 53.60 | -0.67 | 1.03 |
| Knottingley | GBR | 53.72 | -1.23 | 1.03 |
| London | GBR | 51.50 | -0.07 | 1.05 |
| Manchester | GBR | 53.47 | -2.28 | 1.07 |
| Neap House | GBR | 53.62 | -0.67 | 1.03 |
| Northwich | GBR | 53.27 | -2.53 | 1.09 |
| Old Kilpatrick | GBR | 55.92 | -4.45 | 1.10 |
| Paisley | GBR | 55.85 | -4.43 | 1.10 |
| Partington | GBR | 53.43 | -2.43 | 1.09 |
| Renfrew | GBR | 55.87 | -4.40 | 1.10 |
| Selby | GBR | 53.78 | -1.07 | 1.02 |
| Thorne | GBR | 53.62 | -0.97 | 1.01 |
| Winnington | GBR | 53.28 | -2.52 | 1.09 |
| Budapest | HUN | 47.50 | 19.03 | 0.89 |
| Klaipeda | LTU | 55.72 | 21.13 | 0.73 |
| Engure | LVA | 57.17 | 23.23 | 0.79 |
| Labrags | LVA | 56.98 | 21.37 | 0.91 |
| Liepaja | LVA | 56.52 | 21.02 | 0.82 |
| Mersrags | LVA | 57.37 | 23.13 | 0.73 |
| Pavilosta | LVA | 56.90 | 21.18 | 0.81 |
| Riga | LVA | 56.97 | 24.10 | 0.61 |
| Roja | LVA | 57.50 | 22.82 | 0.71 |
| Salacgriva | LVA | 57.75 | 24.37 | 0.64 |
| Skulte | LVA | 57.32 | 24.40 | 0.62 |

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|---|---|---|---|---|
| Ventspils | LVA | 57.40 | 21.55 | 0.82 |
| Chisinau | MDA | 47.02 | 28.83 | 0.72 |
| Aalst | NLD | 51.38 | 5.45 | 0.88 |
| Alblasserdam | NLD | 51.87 | 4.62 | 0.82 |
| Ameide | NLD | 51.95 | 4.95 | 0.81 |
| Amsterdam | NLD | 52.37 | 4.90 | 1.08 |
| Arnhem | NLD | 51.97 | 5.88 | 0.86 |
| Assen | NLD | 53.00 | 6.57 | 0.87 |
| Axel Sassing | NLD | 51.28 | 3.87 | 1.02 |
| Bergambacht | NLD | 51.93 | 4.78 | 0.81 |
| Bergen-op-Zoom | NLD | 51.50 | 4.27 | 1.05 |
| Bolnes | NLD | 51.90 | 4.57 | 0.82 |
| Bruinisse | NLD | 51.67 | 4.10 | 0.97 |
| Capelle aan den Yssel | NLD | 51.92 | 4.57 | 0.82 |
| Culemborg | NLD | 51.95 | 5.22 | 0.87 |
| Deest | NLD | 51.88 | 5.67 | 0.87 |
| Den Bommel | NLD | 51.72 | 4.28 | 0.97 |
| Dintelmond | NLD | 51.67 | 4.38 | 0.93 |
| Dinteloord | NLD | 51.63 | 4.37 | 0.93 |
| Dodewaard | NLD | 51.90 | 5.63 | 0.87 |
| Dordrecht | NLD | 51.80 | 4.65 | 0.82 |
| Druten | NLD | 51.88 | 5.62 | 0.87 |
| Eindhoven | NLD | 51.43 | 5.50 | 0.88 |
| Fijnaart | NLD | 51.63 | 4.48 | 0.92 |
| Geertruidenberg | NLD | 51.72 | 4.87 | 0.89 |
| Gendt | NLD | 51.87 | 5.98 | 0.86 |
| Gorinchem | NLD | 51.82 | 4.98 | 0.89 |
| Grave | NLD | 51.75 | 5.75 | 0.88 |
| Groot-Ammers | NLD | 51.92 | 4.83 | 0.81 |
| Hardinxveld | NLD | 51.82 | 4.85 | 0.81 |
| Heerewaarden | NLD | 51.82 | 5.38 | 0.88 |
| Heerjansdam | NLD | 51.83 | 4.57 | 0.82 |
| Heijen | NLD | 51.68 | 5.98 | 0.87 |
| Hellevoetsluis | NLD | 51.82 | 4.13 | 1.06 |
| Hendrik Ido Ambacht | NLD | 51.85 | 4.62 | 0.82 |
| Heusden | NLD | 51.73 | 5.15 | 0.88 |
| Huissen | NLD | 51.92 | 5.92 | 0.86 |
| Kinderdijk | NLD | 51.88 | 4.63 | 0.82 |
| Krimpen aan den Yssel | NLD | 51.90 | 4.58 | 0.82 |
| Lekkerkerk | NLD | 51.92 | 4.63 | 0.82 |
| Lithoyen | NLD | 51.82 | 5.43 | 0.88 |
| Lobith | NLD | 51.87 | 6.13 | 0.86 |
| Maasbracht | NLD | 51.13 | 5.87 | 0.86 |
| Maashees | NLD | 51.57 | 6.03 | 0.88 |
| Maassluis | NLD | 51.92 | 4.25 | 0.89 |
| Maastricht | NLD | 50.85 | 5.68 | 0.85 |
| Made | NLD | 51.68 | 4.80 | 0.90 |
| Middelharnis | NLD | 51.78 | 4.20 | 1.00 |
| Millingen aan den Rijn | NLD | 51.87 | 6.03 | 0.86 |
| Moerdijk | NLD | 51.70 | 4.62 | 0.93 |

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| Nieuw Lekkerland | NLD | 51.88 | 4.63 | 0.82 |
| Nieuwerkerk aan den Yssel | NLD | 51.97 | 4.58 | 0.82 |
| Nijmegen | NLD | 51.83 | 5.83 | 0.88 |
| Numansdorp | NLD | 51.72 | 4.42 | 0.96 |
| Ooltgensplaat | NLD | 51.68 | 4.33 | 0.95 |
| Oosterhout | NLD | 51.62 | 4.87 | 0.89 |
| Oss | NLD | 51.77 | 5.52 | 0.88 |
| Ouderkerk | NLD | 51.93 | 4.60 | 0.82 |
| Oudewater | NLD | 52.03 | 4.88 | 1.09 |
| Ouwerkerk | NLD | 51.63 | 3.98 | 1.05 |
| Overschie | NLD | 51.93 | 4.42 | 0.84 |
| Paal | NLD | 51.35 | 4.12 | 1.06 |
| Papendrecht | NLD | 51.83 | 4.63 | 0.82 |
| Raamsdonksveer | NLD | 51.70 | 4.92 | 0.89 |
| Renkum | NLD | 51.97 | 5.73 | 0.86 |
| Rhenen | NLD | 51.95 | 5.57 | 0.87 |
| Ridderkerk | NLD | 51.87 | 4.58 | 0.82 |
| Rijswijk | NLD | 51.78 | 5.02 | 0.88 |
| Roermond | NLD | 51.20 | 5.98 | 0.87 |
| Rotterdam | NLD | 51.90 | 4.48 | 0.83 |
| Sas van Ghent | NLD | 51.23 | 3.80 | 0.97 |
| Schiedam | NLD | 51.90 | 4.40 | 0.86 |
| 'sGravendeel | NLD | 51.77 | 4.60 | 0.82 |
| 'sHertogenbosch | NLD | 51.70 | 5.30 | 0.90 |
| Sliedrecht | NLD | 51.83 | 4.75 | 0.81 |
| Slikkerveer | NLD | 51.88 | 4.60 | 0.82 |
| Sluiskil | NLD | 51.30 | 3.83 | 1.03 |
| Spijk | NLD | 51.87 | 5.05 | 0.88 |
| St. Annaland | NLD | 51.62 | 4.10 | 0.90 |
| Stavenisse | NLD | 51.58 | 4.00 | 1.05 |
| Stein | NLD | 50.97 | 5.77 | 0.85 |
| Swalmen | NLD | 51.22 | 6.02 | 0.87 |
| Tegelen | NLD | 51.35 | 6.13 | 0.88 |
| Tiel | NLD | 51.88 | 5.45 | 0.87 |
| Tilburg | NLD | 51.55 | 5.07 | 0.88 |
| Venlo | NLD | 51.37 | 6.17 | 0.88 |
| Vlaardingen | NLD | 51.90 | 4.35 | 0.86 |
| Waalwijk | NLD | 51.70 | 5.07 | 0.88 |
| Wageningen | NLD | 51.97 | 5.67 | 0.87 |
| Wanssum | NLD | 51.53 | 6.08 | 0.88 |
| Wartena | NLD | 53.15 | 5.90 | 1.00 |
| Werkendam | NLD | 51.80 | 4.90 | 0.81 |
| Willemstad | NLD | 51.68 | 4.40 | 0.94 |
| Zaltbommel | NLD | 51.80 | 5.20 | 0.89 |
| Zuilichem | NLD | 51.80 | 5.12 | 0.89 |
| Zwijndrecht | NLD | 51.82 | 4.65 | 0.82 |
| Fiborgtangen | NOR | 63.72 | 11.17 | 1.04 |
| Herre | NOR | 59.10 | 9.53 | 0.87 |
| Hoylandsbygdi | NOR | 59.77 | 5.78 | 1.07 |
| Hoylandssundet | NOR | 59.78 | 5.80 | 1.05 |

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|---|---|---|---|---|
| Langangen | NOR | 59.08 | 9.80 | 1.05 |
| Levanger | NOR | 63.75 | 11.30 | 1.05 |
| Lofallstrand | NOR | 60.02 | 6.00 | 0.97 |
| Menstad | NOR | 59.17 | 9.65 | 0.81 |
| Porsgrunn | NOR | 59.13 | 9.65 | 0.86 |
| Skien | NOR | 59.20 | 9.62 | 0.87 |
| Steinkjer | NOR | 64.02 | 11.50 | 1.10 |
| Verdal | NOR | 63.78 | 11.43 | 1.06 |
| Darlowo | POL | 54.43 | 16.38 | 0.77 |
| Elblag | POL | 54.17 | 19.40 | 0.75 |
| Frombork | POL | 54.35 | 19.67 | 0.80 |
| Gdansk | POL | 54.35 | 18.65 | 0.84 |
| Gdynia | POL | 54.53 | 18.55 | 0.91 |
| Kolobrzeg | POL | 54.18 | 15.57 | 0.79 |
| Kozle | POL | 50.32 | 18.13 | 0.55 |
| Niechorze | POL | 54.10 | 15.07 | 0.78 |
| Nowa Sol | POL | 51.80 | 15.72 | 0.59 |
| Plock | POL | 52.53 | 19.67 | 0.43 |
| Police | POL | 53.55 | 14.60 | 0.81 |
| Puck | POL | 54.72 | 18.35 | 0.81 |
| Stepnica | POL | 53.65 | 14.63 | 0.81 |
| Swinoujscie | POL | 53.93 | 14.28 | 0.88 |
| Szczecin | POL | 53.42 | 14.55 | 0.81 |
| Tczew | POL | 54.08 | 18.77 | 0.78 |
| Ustka | POL | 54.58 | 16.87 | 0.95 |
| Wladyslawowo | POL | 54.80 | 18.42 | 0.93 |
| Wroclaw | POL | 51.08 | 17.00 | 0.57 |
| Pyongyang | PRK | 39.00 | 125.75 | 1.00 |
| Songnim | PRK | 38.73 | 125.62 | 1.10 |
| Bazias | ROM | 44.80 | 21.40 | 0.90 |
| Braila | ROM | 45.25 | 27.98 | 0.93 |
| Bucharest | ROM | 44.42 | 26.12 | 0.93 |
| Calarasi | ROM | 44.18 | 27.32 | 1.00 |
| Galatz | ROM | 45.42 | 28.08 | 0.92 |
| Giurgiu | ROM | 43.90 | 25.97 | 1.00 |
| Oltenitza | ROM | 44.03 | 26.58 | 0.99 |
| Orsova | ROM | 44.70 | 22.37 | 0.74 |
| Tulcea | ROM | 45.17 | 28.82 | 0.86 |
| Turnu Severin | ROM | 44.63 | 22.67 | 0.93 |
| Akhtubinsk | RUS | 48.33 | 46.17 | 0.92 |
| Annenskiy Most | RUS | 60.72 | 37.08 | 0.51 |
| Astrakhan | RUS | 46.37 | 48.07 | 0.88 |
| Bagaevskaya | RUS | 47.32 | 40.38 | 0.88 |
| Balakhna | RUS | 56.48 | 43.62 | 0.11 |
| Balakovo | RUS | 52.07 | 47.77 | 0.45 |
| Baltiysk | RUS | 54.65 | 19.90 | 0.85 |
| Belyy Ruchey | RUS | 60.90 | 36.83 | 0.53 |
| Berezniki | RUS | 59.43 | 56.82 | 0.39 |
| Brusnichnoye | RUS | 60.78 | 28.73 | 0.52 |
| Cheboksary | RUS | 56.13 | 47.23 | 0.10 |

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| Cherepovets | RUS | 59.15 | 37.83 | 0.36 |
| Chkalovsk | RUS | 56.75 | 43.23 | 0.13 |
| Gorokhovets | RUS | 56.18 | 42.70 | 0.11 |
| Igarka | RUS | 67.50 | 86.67 | 1.05 |
| Kalach-na-Donu | RUS | 48.72 | 43.48 | 0.69 |
| Kaliningrad | RUS | 54.72 | 20.52 | 0.73 |
| Kamyshin | RUS | 50.08 | 45.40 | 0.63 |
| Kanonerskiy Is. | RUS | 59.90 | 30.22 | 0.45 |
| Kazan | RUS | 55.75 | 49.17 | 0.08 |
| Khabarovsk | RUS | 48.50 | 135.17 | 0.37 |
| Kineshma | RUS | 57.45 | 42.12 | 0.22 |
| Kirovsk | RUS | 59.87 | 30.98 | 0.48 |
| Komsomolsk-na-Amure | RUS | 50.53 | 136.98 | 0.48 |
| Kondopoga | RUS | 62.20 | 34.28 | 0.56 |
| Konstantinovsk | RUS | 47.55 | 41.10 | 0.81 |
| Kostroma | RUS | 57.77 | 40.93 | 0.18 |
| Kotlas | RUS | 61.25 | 46.65 | 0.47 |
| Krasnoyarsk | RUS | 56.08 | 92.77 | 0.37 |
| Krasnyye Barrikady | RUS | 46.20 | 47.85 | 0.91 |
| Kronshtadt | RUS | 60.00 | 29.77 | 0.49 |
| Lomonosov | RUS | 59.83 | 29.80 | 0.51 |
| Mago | RUS | 53.25 | 140.22 | 0.65 |
| Medvezhyegorsk | RUS | 62.93 | 34.47 | 0.66 |
| Mondoma | RUS | 59.93 | 37.47 | 0.48 |
| Naberezhnyye Chelny | RUS | 55.68 | 52.30 | 0.11 |
| Nadvoitsy | RUS | 63.93 | 34.33 | 0.75 |
| Navashino | RUS | 55.55 | 42.18 | 0.08 |
| Nikolayevsk | RUS | 53.13 | 140.72 | 0.69 |
| Nikolayevskaya | RUS | 47.60 | 41.48 | 0.84 |
| Nizhnekamsk | RUS | 55.42 | 51.88 | 0.11 |
| Nizhnetambovskoye | RUS | 50.93 | 138.17 | 0.53 |
| Nizhniy Novgorod | RUS | 56.33 | 44.00 | 0.12 |
| Nizhnyaya Gavan | RUS | 52.40 | 140.43 | 0.64 |
| Novgorod | RUS | 58.50 | 31.33 | 0.32 |
| Novocheboksarsk | RUS | 56.10 | 47.48 | 0.08 |
| Olya | RUS | 45.78 | 47.53 | 0.97 |
| Otradnoye | RUS | 59.77 | 30.80 | 0.47 |
| Pechora | RUS | 65.23 | 57.30 | 0.81 |
| Perm | RUS | 58.02 | 56.17 | 0.27 |
| Petrodvorets | RUS | 59.88 | 29.92 | 0.47 |
| Petrozavodsk | RUS | 61.77 | 34.32 | 0.58 |
| Pionerskiy | RUS | 54.93 | 20.20 | 0.74 |
| Podporozhye | RUS | 60.92 | 34.03 | 0.46 |
| Primorsk | RUS | 60.37 | 28.63 | 0.53 |
| Priozersk | RUS | 61.02 | 30.13 | 0.51 |
| Pudozh | RUS | 61.83 | 36.53 | 0.52 |
| Rybinsk | RUS | 58.02 | 38.87 | 0.28 |
| Samara | RUS | 53.17 | 50.17 | 0.25 |
| Saratov | RUS | 51.50 | 45.92 | 0.53 |
| Segezha | RUS | 63.70 | 34.32 | 0.75 |

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| Semikarakorsk | RUS | 47.55 | 41.10 | 0.81 |
| Shlisselburg | RUS | 59.93 | 31.13 | 0.48 |
| Solikamsk | RUS | 59.67 | 56.75 | 0.42 |
| Sosnovka | RUS | 56.23 | 51.28 | 0.11 |
| St. Petersburg | RUS | 59.93 | 30.30 | 0.45 |
| Svetlyy | RUS | 54.63 | 20.15 | 0.74 |
| Syzran | RUS | 53.17 | 48.48 | 0.28 |
| Taganrog | RUS | 47.20 | 38.95 | 1.10 |
| Tatyanka | RUS | 45.93 | 48.28 | 0.98 |
| Tolyatti | RUS | 53.53 | 49.40 | 0.20 |
| Tomsk | RUS | 56.50 | 85.08 | 0.36 |
| Ust Donets | RUS | 47.67 | 40.95 | 0.82 |
| Ust-Luga | RUS | 59.67 | 28.30 | 0.57 |
| Volgodonsk | RUS | 47.50 | 42.12 | 0.81 |
| Volgograd | RUS | 48.75 | 44.50 | 0.75 |
| Volzhskiy | RUS | 48.82 | 44.73 | 0.84 |
| Voznesenye | RUS | 61.02 | 35.47 | 0.47 |
| Vyborg | RUS | 60.72 | 28.73 | 0.52 |
| Vysotsk | RUS | 60.63 | 28.57 | 0.52 |
| Vytegra | RUS | 61.07 | 36.45 | 0.47 |
| Yakutsk | RUS | 62.02 | 129.73 | 0.86 |
| Yaroslavl | RUS | 57.57 | 39.87 | 0.19 |
| Zelenodolsk | RUS | 55.83 | 48.50 | 0.07 |
| Apatin | SCG | 45.67 | 19.00 | 0.87 |
| Belgrade | SCG | 44.80 | 20.47 | 1.01 |
| Bezdam | SCG | 45.83 | 18.93 | 0.87 |
| Kladovo | SCG | 44.60 | 22.55 | 0.93 |
| Mitrovica | SCG | 42.90 | 20.87 | 0.59 |
| Novi Becej | SCG | 45.58 | 20.13 | 0.91 |
| Novi Sad | SCG | 45.27 | 19.83 | 0.90 |
| Pancevo | SCG | 44.87 | 20.67 | 1.04 |
| Bratislava | SVK | 48.15 | 17.12 | 0.69 |
| Komarno | SVK | 47.77 | 18.08 | 0.76 |
| Aelvenaes | SWE | 59.37 | 13.18 | 0.58 |
| Ahus | SWE | 55.93 | 14.32 | 1.09 |
| Amal | SWE | 59.05 | 12.72 | 0.59 |
| Ar | SWE | 57.92 | 18.95 | 0.92 |
| Arvika | SWE | 59.67 | 12.58 | 0.59 |
| Balsta | SWE | 59.55 | 17.55 | 0.67 |
| Bergkvara | SWE | 56.38 | 16.08 | 1.01 |
| Borgholm | SWE | 56.88 | 16.65 | 0.96 |
| Bungenas | SWE | 57.82 | 19.08 | 0.92 |
| Byxelkrok | SWE | 57.30 | 17.03 | 0.91 |
| Dalaro | SWE | 59.13 | 18.42 | 0.93 |
| Degerhamn | SWE | 56.35 | 16.42 | 0.99 |
| Edsvalla | SWE | 59.43 | 13.23 | 0.58 |
| Elleholm | SWE | 56.17 | 14.73 | 0.86 |
| Enkoping | SWE | 59.63 | 17.08 | 0.73 |
| Farjestaden | SWE | 56.65 | 16.47 | 0.99 |
| Farosund | SWE | 57.87 | 19.07 | 0.92 |

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|---|---|---|---|---|
| Fiskeback | SWE | 57.87 | 14.10 | 0.68 |
| Fittja | SWE | 59.23 | 17.85 | 0.65 |
| Forsmark | SWE | 60.42 | 18.20 | 0.99 |
| Furillen | SWE | 57.77 | 19.00 | 0.88 |
| Furusund | SWE | 59.65 | 18.90 | 0.94 |
| Gamleby | SWE | 57.90 | 16.42 | 0.81 |
| Gefle | SWE | 60.67 | 17.17 | 0.80 |
| Grisslehamn | SWE | 60.10 | 18.82 | 0.99 |
| Gruvon | SWE | 59.33 | 13.12 | 0.58 |
| Hallekis | SWE | 58.67 | 13.42 | 0.60 |
| Hallstavik | SWE | 60.05 | 18.60 | 0.98 |
| Haparanda | SWE | 65.83 | 24.13 | 0.87 |
| Haraholmen | SWE | 65.23 | 21.63 | 0.83 |
| Hargshamn | SWE | 60.17 | 18.48 | 0.98 |
| Hasselby | SWE | 59.37 | 17.82 | 0.65 |
| Hernosand | SWE | 62.63 | 17.93 | 0.79 |
| Hoglunda | SWE | 59.42 | 13.25 | 0.58 |
| Hogmarso | SWE | 59.65 | 18.85 | 0.94 |
| Honsater | SWE | 58.63 | 13.45 | 0.60 |
| Hornefors | SWE | 63.62 | 19.90 | 0.79 |
| Hudiksvall | SWE | 61.72 | 17.12 | 1.02 |
| Iggesund | SWE | 61.65 | 17.10 | 1.02 |
| Kagehamn | SWE | 64.83 | 21.03 | 0.85 |
| Kalix | SWE | 65.85 | 23.13 | 0.93 |
| Kallvik | SWE | 57.88 | 16.72 | 1.02 |
| Kallviken | SWE | 64.33 | 21.37 | 0.81 |
| Kalmar | SWE | 56.67 | 16.37 | 0.99 |
| Kalmarsand | SWE | 59.53 | 17.52 | 0.67 |
| Kapellskar | SWE | 59.72 | 19.00 | 0.98 |
| Kappelshamn | SWE | 57.85 | 18.78 | 0.92 |
| Karlshamn | SWE | 56.17 | 14.87 | 0.88 |
| Karlskrona | SWE | 56.17 | 15.60 | 0.87 |
| Karlstad | SWE | 59.38 | 13.52 | 0.58 |
| Klintehamn | SWE | 57.38 | 18.20 | 0.87 |
| Koping | SWE | 59.52 | 16.00 | 0.69 |
| Kopmannebro | SWE | 58.77 | 12.52 | 0.58 |
| Kristinehamn | SWE | 59.32 | 14.12 | 0.58 |
| Krokstad | SWE | 59.10 | 12.92 | 0.57 |
| Kungsor | SWE | 59.43 | 16.10 | 0.66 |
| Kyrkebyn | SWE | 59.27 | 13.07 | 0.58 |
| Landsort | SWE | 58.73 | 17.87 | 0.96 |
| Lidkoping | SWE | 58.50 | 13.17 | 0.60 |
| Liljeholmsviken | SWE | 59.32 | 18.00 | 0.65 |
| Ljustero | SWE | 59.52 | 18.63 | 0.70 |
| Loudden | SWE | 59.33 | 18.13 | 0.65 |
| Lulea | SWE | 65.58 | 22.17 | 0.85 |
| Mariestad | SWE | 58.72 | 13.83 | 0.59 |
| Marsviken | SWE | 58.67 | 16.95 | 0.69 |
| Mem | SWE | 58.48 | 16.42 | 0.68 |
| Monsteras | SWE | 57.03 | 16.47 | 0.85 |

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|---|---|---|---|---|
| Morbylanga | SWE | 56.53 | 16.37 | 0.99 |
| Motala | SWE | 58.53 | 15.07 | 0.59 |
| Munksund | SWE | 65.28 | 21.48 | 0.85 |
| Norrkoping | SWE | 58.60 | 16.20 | 0.68 |
| Norrsundet | SWE | 60.95 | 17.17 | 0.78 |
| Norrtalje | SWE | 59.75 | 18.70 | 0.72 |
| Norsbron | SWE | 59.42 | 13.23 | 0.58 |
| Nykoping | SWE | 58.75 | 17.02 | 0.69 |
| Nynashamn | SWE | 58.90 | 17.95 | 0.96 |
| Oaxen | SWE | 55.97 | 17.72 | 0.94 |
| Orebro | SWE | 59.28 | 15.18 | 0.60 |
| Oregrund | SWE | 60.33 | 18.45 | 0.97 |
| Ornskoldsvik | SWE | 63.27 | 18.72 | 0.78 |
| Oskarshamn | SWE | 57.27 | 16.45 | 0.84 |
| Otterbacken | SWE | 58.95 | 14.05 | 0.61 |
| Oxelosund | SWE | 58.67 | 17.12 | 0.95 |
| Pataholm | SWE | 56.92 | 16.43 | 0.98 |
| Ronehamn | SWE | 57.17 | 18.53 | 0.96 |
| Ronneby | SWE | 56.17 | 15.30 | 0.87 |
| Rundvik | SWE | 63.53 | 19.45 | 0.82 |
| Saffle | SWE | 59.13 | 12.93 | 0.57 |
| Sandhamn | SWE | 59.28 | 18.90 | 0.95 |
| Sankt Anna | SWE | 58.33 | 16.70 | 0.69 |
| Simpevarp | SWE | 57.42 | 16.67 | 1.04 |
| Simrishamn | SWE | 55.55 | 14.37 | 1.06 |
| Sjotorp | SWE | 58.83 | 14.00 | 0.60 |
| Skattkar | SWE | 59.42 | 13.70 | 0.58 |
| Skelleftea | SWE | 64.73 | 20.95 | 0.88 |
| Skoghall | SWE | 59.32 | 13.45 | 0.55 |
| Skutskar | SWE | 60.65 | 17.40 | 0.73 |
| Slite | SWE | 57.70 | 18.82 | 0.96 |
| Slottsbron | SWE | 59.33 | 13.10 | 0.58 |
| Soderhamn | SWE | 61.32 | 17.10 | 1.03 |
| Soderkoping | SWE | 58.48 | 16.33 | 0.69 |
| Sodertalje | SWE | 59.20 | 17.63 | 0.92 |
| Solvesborg | SWE | 56.05 | 14.58 | 0.87 |
| Soraker | SWE | 62.50 | 17.50 | 0.78 |
| Spesshult | SWE | 59.07 | 12.92 | 0.57 |
| Stavsnas | SWE | 59.28 | 18.68 | 0.94 |
| Stockholm | SWE | 59.32 | 18.05 | 0.65 |
| Stocksund | SWE | 59.38 | 18.05 | 0.65 |
| Stora Vika | SWE | 58.93 | 17.78 | 0.96 |
| Storugns | SWE | 57.83 | 18.80 | 0.92 |
| Straa | SWE | 57.90 | 19.03 | 0.92 |
| Strangnas | SWE | 59.38 | 17.03 | 0.72 |
| Studsvik | SWE | 58.75 | 17.28 | 0.69 |
| Sturko | SWE | 56.08 | 15.67 | 0.87 |
| Sundsvall | SWE | 62.42 | 17.33 | 0.85 |
| Taxinge | SWE | 59.22 | 17.37 | 0.68 |
| Torko | SWE | 56.15 | 15.40 | 0.87 |

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|---|---|---|---|---|
| Trelleborg | SWE | 55.37 | 13.15 | 0.84 |
| Umea | SWE | 63.70 | 20.35 | 1.07 |
| Uppsala | SWE | 59.87 | 17.65 | 0.54 |
| Valdemarsvik | SWE | 58.20 | 16.60 | 0.69 |
| Vaxholm | SWE | 59.38 | 18.33 | 0.67 |
| Vesteras | SWE | 59.60 | 16.43 | 0.68 |
| Vestervik | SWE | 57.75 | 16.65 | 1.01 |
| Visby | SWE | 57.65 | 18.28 | 0.86 |
| Ystad | SWE | 55.43 | 13.83 | 0.84 |
| Cherkassy | UKR | 49.43 | 32.05 | 0.43 |
| Dneprodzerzhinsk | UKR | 48.50 | 34.62 | 0.57 |
| Dnepropetrovsk | UKR | 48.48 | 35.00 | 0.61 |
| Kiev | UKR | 50.42 | 30.50 | 0.40 |
| Kremenchug | UKR | 49.05 | 33.42 | 0.48 |
| Mariupol | UKR | 47.05 | 37.50 | 1.04 |
| Reni | UKR | 45.43 | 28.30 | 0.92 |
| Tyaginka | UKR | 46.75 | 33.05 | 0.72 |
| Zaporozhye | UKR | 47.83 | 35.17 | 0.75 |
| Albany | USA | 42.65 | -73.75 | 0.62 |
| Allyns Point | USA | 41.43 | -72.07 | 0.85 |
| Alpena | USA | 45.05 | -83.43 | 0.33 |
| Alsen | USA | 42.18 | -73.92 | 0.58 |
| Ashland | USA | 46.58 | -90.90 | 0.31 |
| Ashtabula | USA | 41.92 | -80.82 | 0.63 |
| Bangor | USA | 44.80 | -68.78 | 0.26 |
| Bath | USA | 43.90 | -69.82 | 0.59 |
| Bay City | USA | 43.58 | -83.88 | 0.50 |
| Bayfield | USA | 46.80 | -90.80 | 0.38 |
| Belfast | USA | 44.42 | -69.00 | 0.79 |
| Benton Harbour | USA | 42.12 | -86.45 | 0.49 |
| Beverly | USA | 46.82 | -119.92 | 0.92 |
| Brevort | USA | 46.00 | -85.03 | 0.33 |
| Buchanan | USA | 41.20 | -73.92 | 0.95 |
| Bucksport | USA | 44.57 | -68.80 | 0.53 |
| Buffalo | USA | 42.88 | -78.88 | 0.60 |
| Buffington | USA | 41.63 | -87.42 | 0.51 |
| Burns Harbour | USA | 41.63 | -87.18 | 0.51 |
| Calcite | USA | 45.40 | -83.78 | 0.36 |
| Catskill | USA | 42.22 | -73.88 | 0.58 |
| Cedarville | USA | 45.98 | -84.35 | 0.44 |
| Cementon | USA | 42.13 | -73.92 | 0.63 |
| Charlevoix | USA | 45.32 | -85.22 | 0.28 |
| Cheboygan | USA | 45.67 | -84.47 | 0.32 |
| Chicago | USA | 41.83 | -87.63 | 0.48 |
| Clayton | USA | 44.23 | -76.08 | 0.48 |
| Cleveland | USA | 41.52 | -81.72 | 0.70 |
| Conneaut | USA | 41.97 | -80.57 | 0.62 |
| Coxsackie | USA | 42.33 | -73.80 | 0.60 |
| Detour | USA | 45.97 | -83.88 | 0.46 |
| Detroit | USA | 42.33 | -83.03 | 0.53 |

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|---|---|---|---|---|
| Duluth | USA | 46.73 | -92.15 | 0.46 |
| Erie | USA | 42.17 | -80.08 | 0.62 |
| Escanaba | USA | 45.78 | -87.07 | 0.28 |
| Essexville | USA | 43.60 | -83.83 | 0.50 |
| Fairport | USA | 41.77 | -81.32 | 0.68 |
| Ferrysburg | USA | 43.08 | -86.23 | 0.42 |
| Gary Harbour | USA | 41.60 | -87.35 | 0.50 |
| Grand Haven | USA | 43.07 | -86.25 | 0.43 |
| Grand River | USA | 41.73 | -81.28 | 0.67 |
| Green Bay | USA | 44.52 | -88.00 | 0.37 |
| Harbour Beach | USA | 43.83 | -82.65 | 0.33 |
| Holland (MI) | USA | 42.78 | -86.22 | 0.45 |
| Huron | USA | 41.40 | -82.58 | 0.73 |
| Hyde Park | USA | 41.78 | -73.93 | 0.64 |
| Indiana Harbour | USA | 41.67 | -87.50 | 0.51 |
| Kalama | USA | 46.02 | -122.83 | 0.98 |
| Kenosha | USA | 42.58 | -87.82 | 0.31 |
| Kewaunee | USA | 44.45 | -87.52 | 0.36 |
| Kingston | USA | 41.87 | -73.97 | 0.63 |
| Lafayette | USA | 40.40 | -86.88 | 0.93 |
| Lorain | USA | 41.47 | -82.17 | 0.73 |
| Ludington | USA | 43.97 | -86.45 | 0.49 |
| Mackinaw City | USA | 45.75 | -84.73 | 0.32 |
| Manistee | USA | 44.25 | -86.33 | 0.50 |
| Manitowoc | USA | 44.10 | -87.63 | 0.35 |
| Marblehead | USA | 41.53 | -82.72 | 0.80 |
| Marine City | USA | 42.72 | -82.48 | 0.40 |
| Marinette | USA | 45.12 | -87.62 | 0.28 |
| Marquette | USA | 46.60 | -87.38 | 0.52 |
| Marysville | USA | 42.92 | -82.48 | 0.39 |
| Menominee | USA | 45.13 | -87.62 | 0.29 |
| Milton | USA | 41.60 | -73.95 | 0.76 |
| Milwaukee | USA | 43.05 | -87.87 | 0.31 |
| Monroe | USA | 41.92 | -83.33 | 0.76 |
| Mossville | USA | 40.80 | -89.57 | 0.95 |
| Muskegon | USA | 43.18 | -86.23 | 0.41 |
| New London | USA | 41.40 | -72.10 | 0.95 |
| Newburgh | USA | 41.50 | -74.08 | 0.77 |
| Ogdensburg | USA | 44.70 | -75.50 | 0.31 |
| Olympia | USA | 47.05 | -122.90 | 1.01 |
| Ontonagon | USA | 46.87 | -89.30 | 0.42 |
| Oswego | USA | 43.47 | -76.53 | 0.53 |
| Peekskill | USA | 41.25 | -73.92 | 0.95 |
| Peoria | USA | 40.68 | -89.58 | 0.95 |
| Pittsburgh (PA) | USA | 40.43 | -80.00 | 0.83 |
| Point Pleasant | USA | 38.88 | -82.12 | 1.07 |
| Port Dolomite | USA | 45.97 | -84.27 | 0.39 |
| Port Huron | USA | 42.98 | -82.43 | 0.38 |
| Port Inland | USA | 45.97 | -85.87 | 0.36 |
| Port Washington | USA | 43.38 | -87.87 | 0.32 |

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|---|---|---|---|---|
| Portland (OR) | USA | 45.57 | -122.73 | 1.01 |
| Poughkeepsie | USA | 41.68 | -73.88 | 0.64 |
| Providence | USA | 41.80 | -71.38 | 1.08 |
| Racine | USA | 42.73 | -87.80 | 0.31 |
| Ravena | USA | 42.47 | -73.80 | 0.61 |
| Rensselaer | USA | 42.65 | -73.73 | 0.62 |
| Rochester (NY) | USA | 43.28 | -77.60 | 0.44 |
| Rockport (MI) | USA | 45.20 | -83.38 | 0.36 |
| Rogers City | USA | 45.40 | -83.83 | 0.36 |
| Roseton | USA | 41.57 | -74.00 | 0.67 |
| Saginaw | USA | 43.45 | -83.92 | 0.52 |
| Sandusky | USA | 41.45 | -82.73 | 0.78 |
| Searsport | USA | 44.45 | -68.92 | 1.03 |
| Sheboygan | USA | 43.75 | -87.70 | 0.38 |
| Shippensburg | USA | 40.03 | -77.52 | 0.89 |
| Silver Bay | USA | 47.28 | -91.27 | 0.91 |
| Somerset | USA | 41.78 | -71.13 | 1.02 |
| South Brewer | USA | 44.78 | -68.78 | 0.26 |
| South Haven | USA | 42.45 | -86.25 | 0.46 |
| St. Clair | USA | 42.82 | -82.47 | 0.40 |
| St. Joseph | USA | 42.08 | -86.50 | 0.51 |
| Stoneport | USA | 45.28 | -83.43 | 0.37 |
| Stony Point | USA | 41.23 | -73.97 | 0.95 |
| Superior | USA | 46.72 | -92.08 | 0.46 |
| Taconite Harbour | USA | 47.50 | -90.92 | 0.88 |
| The Dalles | USA | 45.58 | -121.18 | 0.73 |
| Toledo | USA | 41.70 | -83.47 | 0.78 |
| Tomkins Cove | USA | 41.27 | -73.98 | 0.95 |
| Tonawanda | USA | 43.02 | -78.88 | 0.60 |
| Troutdale | USA | 45.53 | -122.38 | 1.02 |
| Troy | USA | 42.73 | -73.68 | 0.61 |
| Two Harbours | USA | 47.02 | -91.67 | 0.77 |
| Umatilla | USA | 45.92 | -119.33 | 1.05 |
| Vancouver | USA | 45.63 | -122.67 | 1.01 |
| Waddington | USA | 44.85 | -75.20 | 0.23 |
| Waukegan | USA | 42.37 | -87.83 | 0.38 |
| Whitefish Point | USA | 46.75 | -84.95 | 0.55 |
| Willbridge | USA | 45.57 | -122.75 | 1.01 |
| Winterport | USA | 44.63 | -68.85 | 0.46 |
| Wiscasset | USA | 44.00 | -69.67 | 0.59 |
| Wyandotte | USA | 42.18 | -83.15 | 0.67 |
| Yonkers | USA | 40.95 | -73.83 | 1.10 |
| Zilwaukee | USA | 43.47 | -83.92 | 0.52 |

Appendix B. List of global ports that have highest environmental similarity to Sorel-Tracy. NIS originating from these ports have the highest potential for survival if introduced at Sorey-Tracy.

| Name | Country | Latitude | Longitude | Environmental Distance |
|---|---|---|---|---|
| Eckero | ALD | 60.22 | 19.60 | 0.91 |
| Korneuburg | AUT | 48.37 | 16.33 | 0.61 |
| Linz | AUT | 48.32 | 14.30 | 0.55 |
| Vienna | AUT | 48.22 | 16.37 | 0.66 |
| Antwerp | BEL | 51.24 | 4.41 | 0.90 |
| Baasrode | BEL | 51.05 | 4.17 | 0.92 |
| Balen | BEL | 51.17 | 5.17 | 0.87 |
| Boom | BEL | 51.08 | 4.37 | 0.89 |
| Brussels | BEL | 50.83 | 4.32 | 0.90 |
| Buggenhout | BEL | 51.02 | 4.20 | 0.90 |
| Burcht | BEL | 51.20 | 4.33 | 0.92 |
| Chatelineau | BEL | 50.42 | 4.52 | 0.84 |
| Dendermonde | BEL | 51.03 | 4.12 | 0.92 |
| Doel | BEL | 51.32 | 4.27 | 0.93 |
| Engis | BEL | 50.58 | 5.40 | 0.83 |
| Ertvelde | BEL | 51.20 | 3.78 | 0.95 |
| Geel | BEL | 51.15 | 4.97 | 0.87 |
| Genk | BEL | 50.94 | 5.50 | 0.86 |
| Ghent | BEL | 51.09 | 3.75 | 0.94 |
| Grimbergen | BEL | 50.93 | 4.37 | 0.88 |
| Grobbendonk | BEL | 51.20 | 4.75 | 0.88 |
| Haren | BEL | 50.90 | 4.38 | 0.88 |
| Hemiksem | BEL | 51.15 | 4.34 | 0.89 |
| Hermalle sous Huy | BEL | 50.55 | 5.37 | 0.83 |
| Hingene | BEL | 51.12 | 4.27 | 0.90 |
| Hoboken | BEL | 51.17 | 4.33 | 0.90 |
| Humbeek | BEL | 50.97 | 4.38 | 0.88 |
| Kallo | BEL | 51.25 | 4.28 | 0.92 |
| Kapelle op den Bos | BEL | 51.02 | 4.37 | 0.89 |
| Kruibeke | BEL | 51.17 | 4.32 | 0.90 |
| Kwaadmechelen | BEL | 51.10 | 5.15 | 0.87 |
| Lanaken | BEL | 50.88 | 5.65 | 0.86 |
| Langerbrugge | BEL | 51.12 | 3.75 | 0.94 |
| Liefkenshoek | BEL | 51.30 | 4.28 | 0.93 |
| Liege | BEL | 50.64 | 5.57 | 0.83 |
| Lillo | BEL | 51.30 | 4.30 | 0.93 |
| Lixhe | BEL | 50.73 | 5.70 | 0.84 |
| Maasmechelen | BEL | 50.97 | 5.70 | 0.86 |
| Marly | BEL | 50.88 | 4.38 | 0.88 |
| Mechelen | BEL | 51.03 | 4.47 | 0.89 |
| Melle | BEL | 51.00 | 3.80 | 0.91 |
| Merksem | BEL | 51.23 | 4.48 | 0.90 |
| Nameche | BEL | 50.47 | 4.98 | 0.84 |
| Niel | BEL | 51.12 | 4.33 | 0.90 |
| Olen | BEL | 51.15 | 4.87 | 0.87 |
| Puurs | BEL | 51.07 | 4.27 | 0.90 |

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|---|---|---|---|---|
| Rieme | BEL | 51.17 | 3.77 | 0.94 |
| Ruisbroek | BEL | 50.78 | 4.28 | 0.90 |
| Rumst | BEL | 51.07 | 4.42 | 0.89 |
| Rupelmonde | BEL | 51.13 | 4.28 | 0.90 |
| Schelle | BEL | 51.13 | 4.32 | 0.90 |
| Schoten | BEL | 51.25 | 4.50 | 0.90 |
| Seilles | BEL | 50.50 | 5.08 | 0.84 |
| Sint-Kruis-Winkel | BEL | 51.15 | 3.80 | 0.94 |
| Temse | BEL | 51.13 | 4.22 | 0.90 |
| Terdonk | BEL | 51.15 | 3.78 | 0.94 |
| Terhagen | BEL | 51.08 | 4.38 | 0.89 |
| Tessenderlo | BEL | 51.07 | 5.08 | 0.87 |
| Tielrode | BEL | 51.12 | 4.22 | 0.90 |
| Tisselt | BEL | 51.03 | 4.37 | 0.89 |
| Val St. Lambert | BEL | 50.57 | 5.47 | 0.83 |
| Verbrande Brug | BEL | 50.95 | 4.38 | 0.88 |
| Vilvoorde | BEL | 50.95 | 4.42 | 0.88 |
| Willebroek | BEL | 51.05 | 4.35 | 0.89 |
| Wintham | BEL | 51.10 | 4.28 | 0.90 |
| Wondelgem | BEL | 51.08 | 3.72 | 0.94 |
| Zelzate | BEL | 51.20 | 3.80 | 0.95 |
| Zutendaal | BEL | 50.92 | 5.57 | 0.86 |
| Zwyndrecht | BEL | 51.22 | 4.33 | 0.92 |
| Kozloduy | BGR | 43.78 | 23.72 | 0.89 |
| Lom | BGR | 43.83 | 23.20 | 0.82 |
| Rousse | BGR | 43.83 | 25.97 | 0.81 |
| Silistra | BGR | 44.10 | 27.25 | 0.82 |
| Amherstburg | CAN | 42.10 | -83.08 | 0.54 |
| Baddeck | CAN | 46.10 | -60.73 | 0.87 |
| Bath | CAN | 44.17 | -76.77 | 0.28 |
| Batiscan | CAN | 46.52 | -72.23 | 0.26 |
| Bayside | CAN | 45.17 | -67.13 | 0.89 |
| Becancour | CAN | 46.40 | -72.38 | 0.18 |
| Belleville | CAN | 44.13 | -77.37 | 0.24 |
| Bowmanville | CAN | 43.90 | -78.67 | 0.31 |
| Boylston | CAN | 45.45 | -61.52 | 1.00 |
| Britt | CAN | 45.77 | -80.58 | 0.43 |
| Brockville | CAN | 44.60 | -75.63 | 0.17 |
| Bronte | CAN | 43.40 | -79.70 | 0.33 |
| Bruce Mines | CAN | 46.27 | -83.72 | 0.65 |
| Burlington | CAN | 43.32 | -79.75 | 0.31 |
| Cardinal | CAN | 44.78 | -75.33 | 0.18 |
| Chicoutimi | CAN | 48.43 | -71.08 | 0.40 |
| Clarkson | CAN | 43.50 | -79.60 | 0.32 |
| Cobourg | CAN | 43.95 | -78.17 | 0.26 |
| Colborne | CAN | 44.00 | -77.88 | 0.25 |
| Collingwood | CAN | 44.50 | -80.23 | 0.34 |
| Contrecoeur | CAN | 45.88 | -73.20 | 0.03 |
| Cornwall | CAN | 45.02 | -74.72 | 0.13 |
| Corunna | CAN | 42.88 | -82.45 | 0.30 |

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|---|---|---|---|---|
| Cote Ste-Catherine | CAN | 45.41 | -73.58 | 0.13 |
| Country Harbour | CAN | 45.22 | -61.73 | 1.04 |
| Courtright | CAN | 42.80 | -82.45 | 0.32 |
| Erieau | CAN | 42.25 | -81.93 | 0.47 |
| Fort Erie | CAN | 42.93 | -78.95 | 0.44 |
| Fredericton | CAN | 45.95 | -66.65 | 0.24 |
| Gananoque | CAN | 44.32 | -76.15 | 0.31 |
| Goderich | CAN | 43.75 | -81.75 | 0.39 |
| Gold River | CAN | 49.68 | -126.12 | 1.05 |
| Goose Bay | CAN | 53.35 | -60.42 | 1.06 |
| Grondines | CAN | 46.75 | -72.03 | 0.38 |
| Hamilton | CAN | 43.23 | -79.85 | 0.35 |
| Hay River | CAN | 60.85 | -115.70 | 1.06 |
| Humberstone | CAN | 42.90 | -79.25 | 0.41 |
| Iona | CAN | 45.97 | -60.80 | 0.56 |
| Killarney | CAN | 45.97 | -81.52 | 0.54 |
| Kingston | CAN | 44.20 | -76.50 | 0.30 |
| Kingsville | CAN | 42.02 | -82.72 | 0.56 |
| Kitimat | CAN | 54.00 | -128.70 | 0.90 |
| Lanoraie | CAN | 45.97 | -73.18 | 0.03 |
| Lauzon | CAN | 46.82 | -71.15 | 0.29 |
| Leamington | CAN | 42.05 | -82.62 | 0.57 |
| Levis | CAN | 46.82 | -71.18 | 0.19 |
| Little Current | CAN | 45.97 | -81.92 | 0.28 |
| Little Narrows | CAN | 45.98 | -60.98 | 0.52 |
| Long Sault | CAN | 45.02 | -74.90 | 0.07 |
| Meldrum Bay | CAN | 45.92 | -83.10 | 0.61 |
| Michipicoten Harbour | CAN | 47.95 | -84.92 | 0.86 |
| Midland | CAN | 44.75 | -79.93 | 0.35 |
| Montréal | CAN | 45.50 | -73.55 | 0.15 |
| Mooretown | CAN | 42.85 | -82.47 | 0.30 |
| Morrisburg | CAN | 44.93 | -75.18 | 0.08 |
| Nanticoke | CAN | 42.82 | -80.07 | 0.37 |
| Nelson | CAN | 49.47 | -117.30 | 1.03 |
| Oakville | CAN | 43.43 | -79.67 | 0.34 |
| Oshawa | CAN | 43.87 | -78.83 | 0.33 |
| Ottawa | CAN | 45.40 | -75.70 | 0.04 |
| Owen Sound | CAN | 44.58 | -80.95 | 0.37 |
| Parry Sound | CAN | 45.37 | -80.05 | 0.35 |
| Pelee Island | CAN | 41.75 | -82.67 | 0.60 |
| Picton | CAN | 44.00 | -77.13 | 0.28 |
| Pointe aux Trembles | CAN | 45.63 | -73.48 | 0.07 |
| Port Alberni | CAN | 49.23 | -125.00 | 1.00 |
| Port Burwell | CAN | 42.63 | -80.80 | 0.38 |
| Port Colborne | CAN | 42.87 | -79.25 | 0.42 |
| Port Credit | CAN | 43.55 | -79.60 | 0.36 |
| Port Dalhousie | CAN | 43.20 | -79.27 | 0.33 |
| Port Dover | CAN | 42.78 | -80.20 | 0.35 |
| Port Hope | CAN | 43.95 | -78.28 | 0.26 |
| Port Maitland | CAN | 42.87 | -79.58 | 0.40 |

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|---|---|---|---|---|
| Port McNicoll | CAN | 44.75 | -79.80 | 0.31 |
| Port Stanley | CAN | 42.67 | -81.22 | 0.37 |
| Port Weller | CAN | 43.23 | -79.22 | 0.33 |
| Prescott | CAN | 44.72 | -75.52 | 0.14 |
| Québec | CAN | 46.82 | -71.20 | 0.19 |
| Sarnia | CAN | 42.98 | -82.42 | 0.30 |
| Sault Ste. Marie | CAN | 46.52 | -84.33 | 0.57 |
| Sombra | CAN | 42.70 | -82.47 | 0.32 |
| Sonora | CAN | 45.07 | -61.92 | 1.07 |
| Sorel | CAN | 46.05 | -73.12 | 0.00 |
| Spragge | CAN | 46.22 | -82.67 | 0.42 |
| St. Catharines | CAN | 43.17 | -79.27 | 0.32 |
| St. Romuald | CAN | 46.75 | -71.23 | 0.19 |
| St. Stephen | CAN | 45.20 | -67.28 | 0.49 |
| Ste. Croix | CAN | 46.63 | -71.73 | 0.26 |
| Thessalon | CAN | 46.25 | -83.55 | 0.63 |
| Thorold | CAN | 43.08 | -79.17 | 0.39 |
| Three Rivers | CAN | 46.35 | -72.55 | 0.16 |
| Thunder Bay | CAN | 48.42 | -89.22 | 1.02 |
| Tobermory | CAN | 45.23 | -81.65 | 0.59 |
| Toronto | CAN | 43.63 | -79.38 | 0.35 |
| Tracy | CAN | 46.02 | -73.17 | 0.05 |
| Valleyfield | CAN | 45.22 | -74.08 | 0.11 |
| Wallaceburg | CAN | 42.60 | -82.40 | 0.32 |
| Welland | CAN | 42.97 | -79.22 | 0.36 |
| Weymouth | CAN | 44.45 | -66.02 | 0.96 |
| Wheatley | CAN | 42.08 | -82.43 | 0.48 |
| Whitby | CAN | 43.85 | -78.92 | 0.36 |
| Windsor | CAN | 42.32 | -83.05 | 0.34 |
| Basle | CHE | 47.55 | 7.57 | 0.69 |
| Dandong | CHN | 40.13 | 124.40 | 0.91 |
| Fujin | CHN | 47.25 | 132.02 | 0.35 |
| Harbin | CHN | 45.73 | 126.60 | 0.38 |
| Heihe | CHN | 50.23 | 127.47 | 0.52 |
| Jiamusi | CHN | 46.80 | 130.35 | 0.34 |
| Panjin | CHN | 41.12 | 122.07 | 0.77 |
| Panshi | CHN | 42.92 | 126.03 | 0.29 |
| Tongjiang | CHN | 47.63 | 132.50 | 0.38 |
| Chvaletice | CZE | 50.02 | 15.43 | 0.57 |
| Usti nad Labem | CZE | 50.67 | 14.03 | 0.58 |
| Aken | DEU | 51.85 | 12.03 | 0.67 |
| Andernach | DEU | 50.42 | 7.38 | 0.77 |
| Anklam | DEU | 53.87 | 13.68 | 0.87 |
| Aschaffenburg | DEU | 49.95 | 9.17 | 0.68 |
| Barth | DEU | 54.37 | 12.73 | 0.92 |
| Bendorf | DEU | 50.42 | 7.58 | 0.76 |
| Berlin | DEU | 52.53 | 13.42 | 0.63 |
| Berne | DEU | 53.18 | 10.50 | 0.78 |
| Bingen | DEU | 49.95 | 7.90 | 0.73 |
| Bodenwerder | DEU | 51.97 | 9.50 | 0.77 |

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|---|---|---|---|---|
| Boizenburg | DEU | 53.38 | 10.73 | 0.78 |
| Bonn | DEU | 50.72 | 7.08 | 0.82 |
| Brandenburg | DEU | 52.40 | 12.52 | 0.66 |
| Braunschweig | DEU | 52.25 | 10.50 | 0.74 |
| Brohl | DEU | 50.42 | 7.30 | 0.77 |
| Castrop Rauxel | DEU | 51.55 | 7.30 | 0.85 |
| Cologne | DEU | 50.93 | 7.00 | 0.84 |
| Deggendorf | DEU | 48.83 | 12.97 | 0.57 |
| Dormagen | DEU | 51.10 | 6.95 | 0.85 |
| Dortmund | DEU | 51.53 | 7.45 | 0.84 |
| Duisburg | DEU | 51.43 | 6.75 | 0.87 |
| Dusseldorf | DEU | 51.25 | 6.77 | 0.86 |
| Eisenhuttenstadt | DEU | 52.15 | 14.62 | 0.54 |
| Emmerich | DEU | 51.85 | 6.25 | 0.89 |
| Erftstadt | DEU | 50.80 | 6.75 | 0.82 |
| Essen | DEU | 51.45 | 7.02 | 0.84 |
| Frankfurt | DEU | 50.12 | 8.67 | 0.69 |
| Geesthacht | DEU | 53.43 | 10.38 | 0.78 |
| Gelsenkirchen | DEU | 51.50 | 7.08 | 0.84 |
| Germersheim | DEU | 49.22 | 8.38 | 0.75 |
| Gernsheim | DEU | 49.75 | 8.47 | 0.72 |
| Greifswald | DEU | 54.10 | 13.38 | 0.94 |
| Haren | DEU | 52.80 | 7.25 | 0.93 |
| Havelberg | DEU | 52.83 | 12.07 | 0.69 |
| Heringsdorf | DEU | 53.97 | 14.17 | 0.83 |
| Hohenhorn | DEU | 53.47 | 10.37 | 0.78 |
| Homberg | DEU | 51.45 | 6.72 | 0.87 |
| Hoya | DEU | 52.80 | 9.13 | 0.79 |
| Ibbenburen | DEU | 52.28 | 7.73 | 0.83 |
| Karlsruhe | DEU | 49.05 | 8.33 | 0.76 |
| Kehl | DEU | 48.58 | 7.83 | 0.74 |
| Koblenz | DEU | 50.33 | 7.58 | 0.75 |
| Krefeld | DEU | 51.33 | 6.57 | 0.87 |
| Kroslin | DEU | 54.13 | 13.75 | 1.00 |
| Ladebow | DEU | 54.10 | 13.45 | 0.94 |
| Lahnstein | DEU | 50.30 | 7.62 | 0.75 |
| Lauenburg | DEU | 53.38 | 10.55 | 0.78 |
| Lauterbach | DEU | 54.33 | 13.52 | 1.03 |
| Leer | DEU | 53.22 | 7.45 | 0.94 |
| Leeseringen | DEU | 52.58 | 9.13 | 0.78 |
| Leverkusen | DEU | 51.02 | 7.03 | 0.83 |
| Lubmin | DEU | 54.12 | 13.60 | 0.91 |
| Ludwigshafen am Rhein | DEU | 49.47 | 8.45 | 0.74 |
| Magdeburg | DEU | 52.13 | 11.62 | 0.67 |
| Mainz | DEU | 50.00 | 8.28 | 0.71 |
| Mannheim | DEU | 49.48 | 8.47 | 0.74 |
| Minden | DEU | 52.30 | 8.90 | 0.78 |
| Monheim | DEU | 51.12 | 6.82 | 0.85 |
| Moselkern | DEU | 50.18 | 7.37 | 0.75 |
| Mukran | DEU | 54.48 | 13.58 | 1.06 |

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|---|---|---|---|---|
| Mulheim | DEU | 50.95 | 7.05 | 0.82 |
| Neckarsteinach | DEU | 49.43 | 8.80 | 0.68 |
| Neuss | DEU | 51.20 | 6.70 | 0.86 |
| Neuss/Dusseldorf | DEU | 51.20 | 6.70 | 0.86 |
| Neuwied | DEU | 50.43 | 7.48 | 0.77 |
| Nienburg | DEU | 52.63 | 9.22 | 0.78 |
| Nuremberg | DEU | 49.45 | 11.05 | 0.61 |
| Orsoy | DEU | 51.53 | 6.68 | 0.87 |
| Osnabruck | DEU | 52.27 | 8.03 | 0.81 |
| Papenburg | DEU | 53.08 | 7.38 | 0.88 |
| Passau | DEU | 48.58 | 13.47 | 0.58 |
| Peenemunde | DEU | 54.12 | 13.77 | 1.00 |
| Peine | DEU | 52.32 | 10.22 | 0.75 |
| Porz | DEU | 50.88 | 7.05 | 0.82 |
| Regensburg | DEU | 49.02 | 12.12 | 0.58 |
| Remagen | DEU | 50.57 | 7.22 | 0.78 |
| Rheinhausen | DEU | 51.42 | 6.73 | 0.87 |
| Rinteln | DEU | 52.20 | 9.08 | 0.78 |
| Rosslau | DEU | 51.90 | 12.27 | 0.66 |
| Rostock | DEU | 54.15 | 12.10 | 0.94 |
| Ruhrort | DEU | 51.45 | 6.73 | 0.87 |
| Salzgitter | DEU | 52.22 | 10.33 | 0.75 |
| Sassnitz | DEU | 54.52 | 13.63 | 1.06 |
| Speyer | DEU | 49.30 | 8.43 | 0.75 |
| Stralsund | DEU | 54.32 | 13.10 | 0.94 |
| Sturzelberg | DEU | 51.12 | 6.80 | 0.85 |
| Stuttgart | DEU | 48.78 | 9.20 | 0.68 |
| Tangermunde | DEU | 52.57 | 11.97 | 0.69 |
| Ueckermunde | DEU | 53.73 | 14.28 | 0.97 |
| Urdingen | DEU | 51.35 | 6.67 | 0.87 |
| Vallendar | DEU | 50.40 | 7.62 | 0.76 |
| Vierow | DEU | 54.10 | 13.57 | 0.91 |
| Walsum | DEU | 51.53 | 6.68 | 0.87 |
| Warnemunde | DEU | 54.18 | 12.08 | 0.96 |
| Weissenthurm | DEU | 50.42 | 7.48 | 0.77 |
| Wesel | DEU | 51.65 | 6.60 | 0.87 |
| Wesseling | DEU | 50.83 | 7.00 | 0.82 |
| Wolgast | DEU | 54.05 | 13.78 | 1.00 |
| Worms | DEU | 49.63 | 8.35 | 0.73 |
| Wurzburg | DEU | 49.78 | 9.93 | 0.67 |
| Gudhjem | DNK | 55.22 | 14.97 | 0.98 |
| Hvalpsund | DNK | 56.68 | 9.20 | 0.89 |
| Logstor | DNK | 56.97 | 9.25 | 0.89 |
| Nekso | DNK | 55.07 | 15.15 | 1.04 |
| Nykobing | DNK | 56.80 | 8.87 | 1.09 |
| Skarrehage | DNK | 56.95 | 8.87 | 1.06 |
| Skive | DNK | 56.57 | 9.03 | 0.89 |
| Stege | DNK | 54.98 | 12.28 | 1.09 |
| Stubbekobing | DNK | 54.88 | 12.03 | 1.06 |
| Svaneke | DNK | 55.13 | 15.15 | 1.04 |

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|---|---|---|---|---|
| Thisted | DNK | 56.95 | 8.70 | 0.96 |
| Bekker | EST | 59.45 | 24.67 | 0.78 |
| Dirhami | EST | 59.22 | 23.50 | 1.04 |
| Forby | EST | 59.00 | 23.17 | 1.00 |
| Haapsalu | EST | 58.95 | 23.53 | 0.78 |
| Heltermaa | EST | 58.87 | 23.07 | 0.88 |
| Kuivastu | EST | 58.58 | 23.40 | 0.86 |
| Kunda | EST | 59.52 | 26.55 | 1.00 |
| Lehtma | EST | 59.05 | 22.70 | 1.08 |
| Loksa | EST | 59.58 | 25.72 | 1.00 |
| Meeruse | EST | 59.45 | 24.68 | 0.77 |
| Miiduranna | EST | 59.50 | 24.82 | 1.07 |
| Montu | EST | 57.95 | 22.12 | 0.91 |
| Muuga | EST | 59.50 | 24.97 | 1.07 |
| Narva Joesuu | EST | 59.47 | 28.05 | 0.72 |
| Paldiski | EST | 59.35 | 24.05 | 1.07 |
| Paljassaare | EST | 59.45 | 24.70 | 0.77 |
| Parnu | EST | 58.38 | 24.48 | 0.70 |
| Peetri | EST | 59.45 | 24.73 | 0.77 |
| Prangli Island | EST | 59.63 | 25.00 | 1.01 |
| Rohukula | EST | 58.90 | 23.42 | 0.88 |
| Roomassaare | EST | 58.22 | 22.52 | 0.86 |
| Saaremaa Harbour | EST | 58.53 | 22.23 | 0.91 |
| Sillamae | EST | 59.40 | 27.78 | 0.72 |
| Tallinn | EST | 59.45 | 24.75 | 0.77 |
| Veere | EST | 58.45 | 22.05 | 0.85 |
| Virtsu | EST | 58.58 | 23.55 | 0.77 |
| Dalsbruk | FIN | 60.03 | 22.52 | 0.81 |
| Hamina | FIN | 60.57 | 27.18 | 0.69 |
| Hanko | FIN | 59.82 | 22.97 | 1.10 |
| Helsinki | FIN | 60.17 | 24.95 | 0.69 |
| Imatra | FIN | 61.17 | 28.83 | 0.60 |
| Inkoo | FIN | 60.05 | 24.02 | 0.87 |
| Isnas | FIN | 60.40 | 26.00 | 0.76 |
| Joensuu | FIN | 62.60 | 29.75 | 0.73 |
| Joutseno | FIN | 61.13 | 28.48 | 0.60 |
| Kantvik | FIN | 60.08 | 24.38 | 0.85 |
| Kaukas | FIN | 61.07 | 28.22 | 0.60 |
| Kaukopaa | FIN | 61.25 | 28.87 | 0.64 |
| Kemi | FIN | 65.73 | 24.57 | 1.04 |
| Kokkila | FIN | 60.33 | 22.87 | 0.82 |
| Kotka | FIN | 60.47 | 26.95 | 0.95 |
| Koverhar | FIN | 59.88 | 23.22 | 1.10 |
| Kristiinankaupunki | FIN | 62.27 | 21.32 | 0.84 |
| Kronvik | FIN | 63.05 | 21.52 | 0.89 |
| Kuopio | FIN | 62.85 | 27.50 | 0.68 |
| Kustavi | FIN | 60.57 | 21.33 | 0.86 |
| Kuuslahti | FIN | 63.12 | 27.75 | 0.66 |
| Lapaluoto | FIN | 64.67 | 24.42 | 0.98 |
| Lappeenranta | FIN | 61.07 | 28.25 | 0.60 |

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|---|---|---|---|---|
| Lappohja | FIN | 59.90 | 23.27 | 1.10 |
| Lappvik | FIN | 59.90 | 23.27 | 1.10 |
| Lauritsala | FIN | 61.08 | 28.33 | 0.60 |
| Loviisa | FIN | 60.45 | 26.23 | 0.73 |
| Luvia | FIN | 61.33 | 21.57 | 0.85 |
| Mantyluoto | FIN | 61.58 | 21.50 | 0.84 |
| Martinniemi | FIN | 65.22 | 25.28 | 0.94 |
| Maxmo | FIN | 63.20 | 22.03 | 0.92 |
| Merikarvia | FIN | 61.85 | 21.47 | 0.88 |
| Mjosund | FIN | 60.22 | 22.47 | 0.78 |
| Mustola | FIN | 61.07 | 28.30 | 0.60 |
| Naantali | FIN | 60.47 | 22.02 | 0.79 |
| Nyhamn | FIN | 62.17 | 21.33 | 0.84 |
| Olkiluoto | FIN | 61.25 | 21.50 | 0.83 |
| Oulu | FIN | 65.00 | 25.47 | 0.91 |
| Parainen | FIN | 60.28 | 22.30 | 0.79 |
| Pateniemi | FIN | 65.08 | 25.40 | 0.93 |
| Perno | FIN | 60.45 | 26.05 | 0.75 |
| Pori | FIN | 61.48 | 21.80 | 0.87 |
| Puhos | FIN | 62.10 | 29.92 | 0.70 |
| Raahe | FIN | 64.68 | 24.48 | 1.01 |
| Rahja | FIN | 64.20 | 23.73 | 0.98 |
| Rauma | FIN | 61.13 | 21.50 | 0.85 |
| Ristiina | FIN | 61.53 | 27.42 | 0.67 |
| Roytta | FIN | 65.77 | 24.15 | 1.05 |
| Salo | FIN | 60.38 | 23.17 | 0.84 |
| Savonlinna | FIN | 61.90 | 28.92 | 0.65 |
| Siilinjarvi | FIN | 63.08 | 27.67 | 0.67 |
| Sipoo | FIN | 60.37 | 25.32 | 0.77 |
| Skogby | FIN | 59.92 | 23.32 | 1.10 |
| Skoldvik | FIN | 60.30 | 25.55 | 0.74 |
| Skuru | FIN | 60.10 | 23.55 | 0.85 |
| Stromma | FIN | 60.18 | 22.90 | 0.82 |
| Summa | FIN | 60.53 | 27.12 | 0.69 |
| Svartback | FIN | 60.28 | 25.53 | 0.74 |
| Taalintehdas | FIN | 60.02 | 22.52 | 0.81 |
| Tammisaari | FIN | 59.98 | 23.43 | 0.82 |
| Teijo | FIN | 60.25 | 22.95 | 0.82 |
| Tolkkinen | FIN | 60.33 | 25.58 | 0.74 |
| Tornio | FIN | 65.85 | 24.15 | 1.03 |
| Tupavuori | FIN | 60.45 | 22.07 | 0.79 |
| Turku | FIN | 60.43 | 22.22 | 0.78 |
| Uusikaupunki | FIN | 60.80 | 21.40 | 0.85 |
| Vaasa | FIN | 63.10 | 21.62 | 0.89 |
| Valkom | FIN | 60.42 | 26.27 | 0.73 |
| Varkaus | FIN | 62.33 | 27.83 | 0.64 |
| Vartsala | FIN | 60.33 | 23.02 | 0.84 |
| Vastanfjard | FIN | 60.05 | 22.65 | 0.81 |
| Veitsiluoto | FIN | 65.70 | 24.62 | 1.04 |
| Annay sous Lens | FRA | 50.47 | 2.87 | 0.95 |

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|---|---|---|---|---|
| Bethune | FRA | 50.53 | 2.63 | 0.99 |
| Bonnieres | FRA | 49.03 | 1.58 | 0.97 |
| Chalon-sur-Saone | FRA | 46.78 | 4.83 | 0.82 |
| Conflans | FRA | 48.98 | 2.10 | 0.96 |
| Duclair | FRA | 49.45 | 0.87 | 1.04 |
| Elbeuf | FRA | 49.28 | 1.12 | 1.01 |
| Gaillon | FRA | 49.17 | 1.32 | 0.98 |
| Grand Couronne | FRA | 49.37 | 0.98 | 1.04 |
| Grigny | FRA | 45.62 | 4.78 | 0.87 |
| Ingrandes | FRA | 47.40 | -0.92 | 1.09 |
| La Mailleraye | FRA | 49.48 | 0.77 | 1.04 |
| Le Pouzin | FRA | 44.75 | 4.75 | 1.07 |
| Le Trait | FRA | 49.47 | 0.80 | 1.04 |
| Les Andelys | FRA | 49.25 | 1.43 | 0.98 |
| Lille | FRA | 50.65 | 3.08 | 0.95 |
| Lillebonne | FRA | 49.52 | 0.53 | 1.08 |
| Limay | FRA | 48.97 | 1.78 | 0.95 |
| Lyon | FRA | 45.77 | 4.83 | 0.87 |
| Mantes | FRA | 48.98 | 1.72 | 0.95 |
| Paris | FRA | 48.87 | 2.33 | 0.99 |
| Petit Couronne | FRA | 49.37 | 1.00 | 1.04 |
| Port Jerome | FRA | 49.47 | 0.53 | 1.09 |
| Rouen | FRA | 49.48 | 1.08 | 1.02 |
| St. Etienne du Rouvray | FRA | 49.37 | 1.12 | 1.02 |
| St. Wandrille | FRA | 49.53 | 0.75 | 1.05 |
| Strasbourg | FRA | 48.57 | 7.70 | 0.74 |
| Vernon | FRA | 49.08 | 1.48 | 0.97 |
| Villeneuve-la-Garenne | FRA | 48.92 | 2.30 | 0.99 |
| Villeneuve-le-Roi | FRA | 48.73 | 2.40 | 0.99 |
| Villequier | FRA | 49.50 | 0.67 | 1.07 |
| Althorpe Wharf | GBR | 53.57 | -0.73 | 1.08 |
| Aylesford | GBR | 51.27 | 0.47 | 1.10 |
| Beckingham | GBR | 53.40 | -0.83 | 1.06 |
| Burton upon Stather | GBR | 53.65 | -0.68 | 1.08 |
| Drax | GBR | 53.73 | -0.98 | 1.07 |
| Flixborough | GBR | 53.62 | -0.68 | 1.08 |
| Gainsborough | GBR | 53.40 | -0.77 | 1.05 |
| Gloucester | GBR | 51.87 | -2.22 | 1.06 |
| Goole | GBR | 53.70 | -0.87 | 1.10 |
| Grove Wharf | GBR | 53.60 | -0.68 | 1.08 |
| Gunness | GBR | 53.58 | -0.72 | 1.08 |
| Gunness Wharf | GBR | 53.58 | -0.68 | 1.08 |
| Halling | GBR | 51.37 | 0.01 | 1.05 |
| Howdendyke | GBR | 53.75 | -0.87 | 1.10 |
| Keadby | GBR | 53.60 | -0.67 | 1.08 |
| Knottingley | GBR | 53.72 | -1.23 | 1.09 |
| London | GBR | 51.50 | -0.07 | 1.05 |
| Neap House | GBR | 53.62 | -0.67 | 1.08 |
| Selby | GBR | 53.78 | -1.07 | 1.08 |
| Thorne | GBR | 53.62 | -0.97 | 1.06 |

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|---|---|---|---|---|
| Budapest | HUN | 47.50 | 19.03 | 0.76 |
| Boretto | ITA | 44.90 | 10.55 | 1.10 |
| Cremona | ITA | 45.13 | 10.02 | 1.04 |
| Pavia | ITA | 45.18 | 9.13 | 1.05 |
| Klaipeda | LTU | 55.72 | 21.13 | 0.80 |
| Engure | LVA | 57.17 | 23.23 | 0.93 |
| Labrags | LVA | 56.98 | 21.37 | 1.02 |
| Liepaja | LVA | 56.52 | 21.02 | 0.90 |
| Mersrags | LVA | 57.37 | 23.13 | 0.87 |
| Pavilosta | LVA | 56.90 | 21.18 | 0.90 |
| Riga | LVA | 56.97 | 24.10 | 0.71 |
| Roja | LVA | 57.50 | 22.82 | 0.85 |
| Salacgriva | LVA | 57.75 | 24.37 | 0.76 |
| Skulte | LVA | 57.32 | 24.40 | 0.73 |
| Ventspils | LVA | 57.40 | 21.55 | 0.92 |
| Chisinau | MDA | 47.02 | 28.83 | 0.58 |
| Aalst | NLD | 51.38 | 5.45 | 0.89 |
| Alblasserdam | NLD | 51.87 | 4.62 | 0.84 |
| Ameide | NLD | 51.95 | 4.95 | 0.82 |
| Amsterdam | NLD | 52.37 | 4.90 | 1.10 |
| Arnhem | NLD | 51.97 | 5.88 | 0.89 |
| Assen | NLD | 53.00 | 6.57 | 0.93 |
| Axel Sassing | NLD | 51.28 | 3.87 | 1.02 |
| Bergambacht | NLD | 51.93 | 4.78 | 0.82 |
| Bergen-op-Zoom | NLD | 51.50 | 4.27 | 1.06 |
| Bolnes | NLD | 51.90 | 4.57 | 0.84 |
| Bruinisse | NLD | 51.67 | 4.10 | 0.99 |
| Capelle aan den Yssel | NLD | 51.92 | 4.57 | 0.84 |
| Culemborg | NLD | 51.95 | 5.22 | 0.90 |
| Deest | NLD | 51.88 | 5.67 | 0.90 |
| Den Bommel | NLD | 51.72 | 4.28 | 0.99 |
| Dintelmond | NLD | 51.67 | 4.38 | 0.94 |
| Dinteloord | NLD | 51.63 | 4.37 | 0.95 |
| Dodewaard | NLD | 51.90 | 5.63 | 0.90 |
| Dordrecht | NLD | 51.80 | 4.65 | 0.84 |
| Druten | NLD | 51.88 | 5.62 | 0.90 |
| Eindhoven | NLD | 51.43 | 5.50 | 0.89 |
| Fijnaart | NLD | 51.63 | 4.48 | 0.93 |
| Geertruidenberg | NLD | 51.72 | 4.87 | 0.91 |
| Gendt | NLD | 51.87 | 5.98 | 0.89 |
| Gorinchem | NLD | 51.82 | 4.98 | 0.91 |
| Grave | NLD | 51.75 | 5.75 | 0.90 |
| Groot-Ammers | NLD | 51.92 | 4.83 | 0.82 |
| Hardinxveld | NLD | 51.82 | 4.85 | 0.82 |
| Heerewaarden | NLD | 51.82 | 5.38 | 0.90 |
| Heerjansdam | NLD | 51.83 | 4.57 | 0.84 |
| Heijen | NLD | 51.68 | 5.98 | 0.89 |
| Hellevoetsluis | NLD | 51.82 | 4.13 | 1.09 |
| Hendrik Ido Ambacht | NLD | 51.85 | 4.62 | 0.84 |
| Heusden | NLD | 51.73 | 5.15 | 0.91 |

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|---|---|---|---|---|
| Huissen | NLD | 51.92 | 5.92 | 0.89 |
| Kinderdijk | NLD | 51.88 | 4.63 | 0.84 |
| Krimpen aan den Yssel | NLD | 51.90 | 4.58 | 0.84 |
| Lekkerkerk | NLD | 51.92 | 4.63 | 0.84 |
| Lithoyen | NLD | 51.82 | 5.43 | 0.90 |
| Lobith | NLD | 51.87 | 6.13 | 0.89 |
| Maasbracht | NLD | 51.13 | 5.87 | 0.86 |
| Maashees | NLD | 51.57 | 6.03 | 0.89 |
| Maassluis | NLD | 51.92 | 4.25 | 0.91 |
| Maastricht | NLD | 50.85 | 5.68 | 0.86 |
| Made | NLD | 51.68 | 4.80 | 0.92 |
| Middelharnis | NLD | 51.78 | 4.20 | 1.03 |
| Millingen aan den Rijn | NLD | 51.87 | 6.03 | 0.89 |
| Moerdijk | NLD | 51.70 | 4.62 | 0.95 |
| Nieuw Lekkerland | NLD | 51.88 | 4.63 | 0.84 |
| Nieuwerkerk aan den Yssel | NLD | 51.97 | 4.58 | 0.84 |
| Nijmegen | NLD | 51.83 | 5.83 | 0.90 |
| Numansdorp | NLD | 51.72 | 4.42 | 0.98 |
| Ooltgensplaat | NLD | 51.68 | 4.33 | 0.97 |
| Oosterhout | NLD | 51.62 | 4.87 | 0.91 |
| Oss | NLD | 51.77 | 5.52 | 0.90 |
| Ouderkerk | NLD | 51.93 | 4.60 | 0.84 |
| Oudewater | NLD | 52.03 | 4.88 | 1.10 |
| Ouwerkerk | NLD | 51.63 | 3.98 | 1.06 |
| Overschie | NLD | 51.93 | 4.42 | 0.87 |
| Paal | NLD | 51.35 | 4.12 | 1.06 |
| Papendrecht | NLD | 51.83 | 4.63 | 0.84 |
| Raamsdonksveer | NLD | 51.70 | 4.92 | 0.91 |
| Renkum | NLD | 51.97 | 5.73 | 0.89 |
| Rhenen | NLD | 51.95 | 5.57 | 0.90 |
| Ridderkerk | NLD | 51.87 | 4.58 | 0.84 |
| Rijswijk | NLD | 51.78 | 5.02 | 0.90 |
| Roermond | NLD | 51.20 | 5.98 | 0.88 |
| Rotterdam | NLD | 51.90 | 4.48 | 0.85 |
| Sas van Ghent | NLD | 51.23 | 3.80 | 0.97 |
| Schiedam | NLD | 51.90 | 4.40 | 0.88 |
| 'sGravendeel | NLD | 51.77 | 4.60 | 0.84 |
| 'sHertogenbosch | NLD | 51.70 | 5.30 | 0.92 |
| Sliedrecht | NLD | 51.83 | 4.75 | 0.82 |
| Slikkerveer | NLD | 51.88 | 4.60 | 0.84 |
| Sluiskil | NLD | 51.30 | 3.83 | 1.03 |
| Spijk | NLD | 51.87 | 5.05 | 0.91 |
| St. Annaland | NLD | 51.62 | 4.10 | 0.91 |
| Stavenisse | NLD | 51.58 | 4.00 | 1.06 |
| Stein | NLD | 50.97 | 5.77 | 0.86 |
| Swalmen | NLD | 51.22 | 6.02 | 0.87 |
| Tegelen | NLD | 51.35 | 6.13 | 0.88 |
| Tiel | NLD | 51.88 | 5.45 | 0.90 |
| Tilburg | NLD | 51.55 | 5.07 | 0.90 |
| Venlo | NLD | 51.37 | 6.17 | 0.88 |

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|---|---|---|---|---|
| Vlaardingen | NLD | 51.90 | 4.35 | 0.88 |
| Waalwijk | NLD | 51.70 | 5.07 | 0.91 |
| Wageningen | NLD | 51.97 | 5.67 | 0.90 |
| Wanssum | NLD | 51.53 | 6.08 | 0.89 |
| Wartena | NLD | 53.15 | 5.90 | 1.05 |
| Werkendam | NLD | 51.80 | 4.90 | 0.82 |
| Willemstad | NLD | 51.68 | 4.40 | 0.96 |
| Zaltbommel | NLD | 51.80 | 5.20 | 0.91 |
| Zuilichem | NLD | 51.80 | 5.12 | 0.91 |
| Zwijndrecht | NLD | 51.82 | 4.65 | 0.84 |
| Herre | NOR | 59.10 | 9.53 | 0.98 |
| Menstad | NOR | 59.17 | 9.65 | 0.93 |
| Porsgrunn | NOR | 59.13 | 9.65 | 0.97 |
| Skien | NOR | 59.20 | 9.62 | 0.99 |
| Darlowo | POL | 54.43 | 16.38 | 0.79 |
| Elblag | POL | 54.17 | 19.40 | 0.79 |
| Frombork | POL | 54.35 | 19.67 | 0.85 |
| Gdansk | POL | 54.35 | 18.65 | 0.94 |
| Gdynia | POL | 54.53 | 18.55 | 1.02 |
| Kolobrzeg | POL | 54.18 | 15.57 | 0.77 |
| Kozle | POL | 50.32 | 18.13 | 0.58 |
| Niechorze | POL | 54.10 | 15.07 | 0.78 |
| Nowa Sol | POL | 51.80 | 15.72 | 0.55 |
| Plock | POL | 52.53 | 19.67 | 0.43 |
| Police | POL | 53.55 | 14.60 | 0.81 |
| Puck | POL | 54.72 | 18.35 | 0.89 |
| Stepnica | POL | 53.65 | 14.63 | 0.81 |
| Swinoujscie | POL | 53.93 | 14.28 | 0.97 |
| Szczecin | POL | 53.42 | 14.55 | 0.82 |
| Tczew | POL | 54.08 | 18.77 | 0.85 |
| Ustka | POL | 54.58 | 16.87 | 1.05 |
| Wladyslawowo | POL | 54.80 | 18.42 | 1.04 |
| Wroclaw | POL | 51.08 | 17.00 | 0.59 |
| Pyongyang | PRK | 39.00 | 125.75 | 0.81 |
| Songnim | PRK | 38.73 | 125.62 | 0.92 |
| Bazias | ROM | 44.80 | 21.40 | 0.78 |
| Braila | ROM | 45.25 | 27.98 | 0.77 |
| Bucharest | ROM | 44.42 | 26.12 | 0.77 |
| Calarasi | ROM | 44.18 | 27.32 | 0.84 |
| Galatz | ROM | 45.42 | 28.08 | 0.77 |
| Giurgiu | ROM | 43.90 | 25.97 | 0.84 |
| Oltenitza | ROM | 44.03 | 26.58 | 0.83 |
| Orsova | ROM | 44.70 | 22.37 | 0.64 |
| Tulcea | ROM | 45.17 | 28.82 | 0.72 |
| Turnu Severin | ROM | 44.63 | 22.67 | 0.79 |
| Akhtubinsk | RUS | 48.33 | 46.17 | 0.72 |
| Annenskiy Most | RUS | 60.72 | 37.08 | 0.71 |
| Astrakhan | RUS | 46.37 | 48.07 | 0.75 |
| Azov | RUS | 47.10 | 39.43 | 0.98 |
| Bagaevskaya | RUS | 47.32 | 40.38 | 0.70 |

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|---|---|---|---|---|
| Balakhna | RUS | 56.48 | 43.62 | 0.31 |
| Balakovo | RUS | 52.07 | 47.77 | 0.26 |
| Baltiysk | RUS | 54.65 | 19.90 | 0.95 |
| Belyy Ruchey | RUS | 60.90 | 36.83 | 0.73 |
| Berezniki | RUS | 59.43 | 56.82 | 0.58 |
| Brusnichnoye | RUS | 60.78 | 28.73 | 0.66 |
| Cheboksary | RUS | 56.13 | 47.23 | 0.29 |
| Cherepovets | RUS | 59.15 | 37.83 | 0.55 |
| Chkalovsk | RUS | 56.75 | 43.23 | 0.33 |
| Gorokhovets | RUS | 56.18 | 42.70 | 0.30 |
| Kalach-na-Donu | RUS | 48.72 | 43.48 | 0.49 |
| Kaliningrad | RUS | 54.72 | 20.52 | 0.79 |
| Kamyshin | RUS | 50.08 | 45.40 | 0.43 |
| Kanonerskiy Is. | RUS | 59.90 | 30.22 | 0.56 |
| Kazan | RUS | 55.75 | 49.17 | 0.19 |
| Khabarovsk | RUS | 48.50 | 135.17 | 0.37 |
| Kineshma | RUS | 57.45 | 42.12 | 0.42 |
| Kirovsk | RUS | 59.87 | 30.98 | 0.61 |
| Komsomolsk-na-Amure | RUS | 50.53 | 136.98 | 0.64 |
| Kondopoga | RUS | 62.20 | 34.28 | 0.75 |
| Konstantinovsk | RUS | 47.55 | 41.10 | 0.63 |
| Kostroma | RUS | 57.77 | 40.93 | 0.38 |
| Kotlas | RUS | 61.25 | 46.65 | 0.66 |
| Krasnoyarsk | RUS | 56.08 | 92.77 | 0.54 |
| Krasnyye Barrikady | RUS | 46.20 | 47.85 | 0.78 |
| Kronshtadt | RUS | 60.00 | 29.77 | 0.62 |
| Lomonosov | RUS | 59.83 | 29.80 | 0.65 |
| Mago | RUS | 53.25 | 140.22 | 0.83 |
| Medvezhyegorsk | RUS | 62.93 | 34.47 | 0.85 |
| Mondoma | RUS | 59.93 | 37.47 | 0.67 |
| Naberezhnyye Chelny | RUS | 55.68 | 52.30 | 0.24 |
| Nadvoitsy | RUS | 63.93 | 34.33 | 0.94 |
| Navashino | RUS | 55.55 | 42.18 | 0.26 |
| Nikolayevsk | RUS | 53.13 | 140.72 | 0.86 |
| Nikolayevskaya | RUS | 47.60 | 41.48 | 0.65 |
| Nizhnekamsk | RUS | 55.42 | 51.88 | 0.24 |
| Nizhnetambovskoye | RUS | 50.93 | 138.17 | 0.71 |
| Nizhniy Novgorod | RUS | 56.33 | 44.00 | 0.31 |
| Nizhnyaya Gavan | RUS | 52.40 | 140.43 | 0.82 |
| Novgorod | RUS | 58.50 | 31.33 | 0.50 |
| Novocheboksarsk | RUS | 56.10 | 47.48 | 0.26 |
| Olya | RUS | 45.78 | 47.53 | 0.83 |
| Otradnoye | RUS | 59.77 | 30.80 | 0.59 |
| Pechora | RUS | 65.23 | 57.30 | 1.00 |
| Perm | RUS | 58.02 | 56.17 | 0.45 |
| Petrodvorets | RUS | 59.88 | 29.92 | 0.59 |
| Petrozavodsk | RUS | 61.77 | 34.32 | 0.77 |
| Pionerskiy | RUS | 54.93 | 20.20 | 0.80 |
| Podporozhye | RUS | 60.92 | 34.03 | 0.65 |
| Primorsk | RUS | 60.37 | 28.63 | 0.67 |

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|---|---|---|---|---|
| Priozersk | RUS | 61.02 | 30.13 | 0.66 |
| Pudozh | RUS | 61.83 | 36.53 | 0.71 |
| Rostov | RUS | 47.17 | 39.70 | 0.98 |
| Rybinsk | RUS | 58.02 | 38.87 | 0.47 |
| Samara | RUS | 53.17 | 50.17 | 0.09 |
| Saratov | RUS | 51.50 | 45.92 | 0.33 |
| Segezha | RUS | 63.70 | 34.32 | 0.94 |
| Semikarakorsk | RUS | 47.55 | 41.10 | 0.63 |
| Shlisselburg | RUS | 59.93 | 31.13 | 0.61 |
| Solikamsk | RUS | 59.67 | 56.75 | 0.60 |
| Sosnovka | RUS | 56.23 | 51.28 | 0.26 |
| St. Petersburg | RUS | 59.93 | 30.30 | 0.56 |
| Svetlyy | RUS | 54.63 | 20.15 | 0.79 |
| Syzran | RUS | 53.17 | 48.48 | 0.10 |
| Taganrog | RUS | 47.20 | 38.95 | 0.96 |
| Tatyanka | RUS | 45.93 | 48.28 | 0.84 |
| Tolyatti | RUS | 53.53 | 49.40 | 0.08 |
| Tomsk | RUS | 56.50 | 85.08 | 0.50 |
| Ust Donets | RUS | 47.67 | 40.95 | 0.64 |
| Ust-Luga | RUS | 59.67 | 28.30 | 0.71 |
| Volgodonsk | RUS | 47.50 | 42.12 | 0.62 |
| Volgograd | RUS | 48.75 | 44.50 | 0.56 |
| Volzhskiy | RUS | 48.82 | 44.73 | 0.65 |
| Voznesenye | RUS | 61.02 | 35.47 | 0.66 |
| Vyborg | RUS | 60.72 | 28.73 | 0.66 |
| Vysotsk | RUS | 60.63 | 28.57 | 0.66 |
| Vytegra | RUS | 61.07 | 36.45 | 0.67 |
| Yakutsk | RUS | 62.02 | 129.73 | 1.00 |
| Yaroslavl | RUS | 57.57 | 39.87 | 0.38 |
| Yeisk | RUS | 46.73 | 38.27 | 1.06 |
| Zelenodolsk | RUS | 55.83 | 48.50 | 0.22 |
| Apatin | SCG | 45.67 | 19.00 | 0.75 |
| Belgrade | SCG | 44.80 | 20.47 | 0.89 |
| Bezdam | SCG | 45.83 | 18.93 | 0.75 |
| Kladovo | SCG | 44.60 | 22.55 | 0.79 |
| Mitrovica | SCG | 42.90 | 20.87 | 0.58 |
| Novi Becej | SCG | 45.58 | 20.13 | 0.78 |
| Novi Sad | SCG | 45.27 | 19.83 | 0.78 |
| Pancevo | SCG | 44.87 | 20.67 | 0.91 |
| Zrenjanin | SCG | 45.37 | 10.38 | 1.00 |
| Bratislava | SVK | 48.15 | 17.12 | 0.60 |
| Komarno | SVK | 47.77 | 18.08 | 0.65 |
| Aelvenaes | SWE | 59.37 | 13.18 | 0.74 |
| Amal | SWE | 59.05 | 12.72 | 0.74 |
| Ar | SWE | 57.92 | 18.95 | 1.05 |
| Arvika | SWE | 59.67 | 12.58 | 0.75 |
| Balsta | SWE | 59.55 | 17.55 | 0.78 |
| Borgholm | SWE | 56.88 | 16.65 | 1.08 |
| Bungenas | SWE | 57.82 | 19.08 | 1.05 |
| Byxelkrok | SWE | 57.30 | 17.03 | 1.05 |

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|---|---|---|---|---|
| Dalaro | SWE | 59.13 | 18.42 | 1.06 |
| Edsvalla | SWE | 59.43 | 13.23 | 0.74 |
| Elleholm | SWE | 56.17 | 14.73 | 0.94 |
| Enkoping | SWE | 59.63 | 17.08 | 0.85 |
| Farosund | SWE | 57.87 | 19.07 | 1.05 |
| Fiskeback | SWE | 57.87 | 14.10 | 0.83 |
| Fittja | SWE | 59.23 | 17.85 | 0.73 |
| Furillen | SWE | 57.77 | 19.00 | 1.02 |
| Furusund | SWE | 59.65 | 18.90 | 1.08 |
| Gamleby | SWE | 57.90 | 16.42 | 0.90 |
| Gefle | SWE | 60.67 | 17.17 | 0.95 |
| Gruvon | SWE | 59.33 | 13.12 | 0.74 |
| Hallekis | SWE | 58.67 | 13.42 | 0.75 |
| Haparanda | SWE | 65.83 | 24.13 | 1.05 |
| Haraholmen | SWE | 65.23 | 21.63 | 1.01 |
| Hasselby | SWE | 59.37 | 17.82 | 0.74 |
| Hernosand | SWE | 62.63 | 17.93 | 0.95 |
| Hoglunda | SWE | 59.42 | 13.25 | 0.74 |
| Hogmarso | SWE | 59.65 | 18.85 | 1.08 |
| Honsater | SWE | 58.63 | 13.45 | 0.75 |
| Hornefors | SWE | 63.62 | 19.90 | 0.96 |
| Kagehamn | SWE | 64.83 | 21.03 | 1.02 |
| Kallviken | SWE | 64.33 | 21.37 | 0.98 |
| Kalmarsand | SWE | 59.53 | 17.52 | 0.78 |
| Kappelshamn | SWE | 57.85 | 18.78 | 1.05 |
| Karlshamn | SWE | 56.17 | 14.87 | 0.97 |
| Karlskrona | SWE | 56.17 | 15.60 | 0.96 |
| Karlstad | SWE | 59.38 | 13.52 | 0.74 |
| Klintehamn | SWE | 57.38 | 18.20 | 0.94 |
| Koping | SWE | 59.52 | 16.00 | 0.85 |
| Kopmannebro | SWE | 58.77 | 12.52 | 0.72 |
| Kristinehamn | SWE | 59.32 | 14.12 | 0.74 |
| Krokstad | SWE | 59.10 | 12.92 | 0.72 |
| Kungsor | SWE | 59.43 | 16.10 | 0.82 |
| Kyrkebyn | SWE | 59.27 | 13.07 | 0.74 |
| Lidkoping | SWE | 58.50 | 13.17 | 0.74 |
| Liljeholmsviken | SWE | 59.32 | 18.00 | 0.73 |
| Ljustero | SWE | 59.52 | 18.63 | 0.80 |
| Loudden | SWE | 59.33 | 18.13 | 0.72 |
| Lulea | SWE | 65.58 | 22.17 | 1.02 |
| Mariestad | SWE | 58.72 | 13.83 | 0.73 |
| Marsviken | SWE | 58.67 | 16.95 | 0.79 |
| Mem | SWE | 58.48 | 16.42 | 0.78 |
| Monsteras | SWE | 57.03 | 16.47 | 0.93 |
| Motala | SWE | 58.53 | 15.07 | 0.74 |
| Munksund | SWE | 65.28 | 21.48 | 1.02 |
| Norrkoping | SWE | 58.60 | 16.20 | 0.78 |
| Norrsundet | SWE | 60.95 | 17.17 | 0.93 |
| Norrtalje | SWE | 59.75 | 18.70 | 0.83 |
| Norsbron | SWE | 59.42 | 13.23 | 0.74 |

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|---|---|---|---|---|
| Nykoping | SWE | 58.75 | 17.02 | 0.78 |
| Oaxen | SWE | 55.97 | 17.72 | 1.05 |
| Orebro | SWE | 59.28 | 15.18 | 0.76 |
| Ornskoldsvik | SWE | 63.27 | 18.72 | 0.95 |
| Oskarshamn | SWE | 57.27 | 16.45 | 0.92 |
| Otterbacken | SWE | 58.95 | 14.05 | 0.76 |
| Oxelosund | SWE | 58.67 | 17.12 | 1.10 |
| Ronehamn | SWE | 57.17 | 18.53 | 1.08 |
| Ronneby | SWE | 56.17 | 15.30 | 0.96 |
| Rundvik | SWE | 63.53 | 19.45 | 0.99 |
| Saffle | SWE | 59.13 | 12.93 | 0.72 |
| Sandhamn | SWE | 59.28 | 18.90 | 1.09 |
| Sankt Anna | SWE | 58.33 | 16.70 | 0.78 |
| Sjotorp | SWE | 58.83 | 14.00 | 0.74 |
| Skattkar | SWE | 59.42 | 13.70 | 0.74 |
| Skelleftea | SWE | 64.73 | 20.95 | 1.06 |
| Skoghall | SWE | 59.32 | 13.45 | 0.71 |
| Skutskar | SWE | 60.65 | 17.40 | 0.87 |
| Slite | SWE | 57.70 | 18.82 | 1.08 |
| Slottsbron | SWE | 59.33 | 13.10 | 0.74 |
| Soderkoping | SWE | 58.48 | 16.33 | 0.79 |
| Sodertalje | SWE | 59.20 | 17.63 | 1.06 |
| Solvesborg | SWE | 56.05 | 14.58 | 0.95 |
| Soraker | SWE | 62.50 | 17.50 | 0.95 |
| Spesshult | SWE | 59.07 | 12.92 | 0.72 |
| Stavsnas | SWE | 59.28 | 18.68 | 1.08 |
| Stockholm | SWE | 59.32 | 18.05 | 0.72 |
| Stocksund | SWE | 59.38 | 18.05 | 0.73 |
| Storugns | SWE | 57.83 | 18.80 | 1.05 |
| Straa | SWE | 57.90 | 19.03 | 1.05 |
| Strangnas | SWE | 59.38 | 17.03 | 0.84 |
| Studsvik | SWE | 58.75 | 17.28 | 0.78 |
| Sturko | SWE | 56.08 | 15.67 | 0.96 |
| Sundsvall | SWE | 62.42 | 17.33 | 1.02 |
| Taxinge | SWE | 59.22 | 17.37 | 0.78 |
| Torko | SWE | 56.15 | 15.40 | 0.96 |
| Trelleborg | SWE | 55.37 | 13.15 | 0.91 |
| Uppsala | SWE | 59.87 | 17.65 | 0.69 |
| Valdemarsvik | SWE | 58.20 | 16.60 | 0.79 |
| Vaxholm | SWE | 59.38 | 18.33 | 0.75 |
| Vesteras | SWE | 59.60 | 16.43 | 0.84 |
| Visby | SWE | 57.65 | 18.28 | 0.93 |
| Ystad | SWE | 55.43 | 13.83 | 0.91 |
| Berdiansk | UKR | 46.75 | 36.78 | 0.99 |
| Cherkassy | UKR | 49.43 | 32.05 | 0.33 |
| Dneprodzerzhinsk | UKR | 48.50 | 34.62 | 0.42 |
| Dnepropetrovsk | UKR | 48.48 | 35.00 | 0.45 |
| Kiev | UKR | 50.42 | 30.50 | 0.34 |
| Kremenchug | UKR | 49.05 | 33.42 | 0.35 |
| Mariupol | UKR | 47.05 | 37.50 | 0.92 |

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|---|---|---|---|---|
| Reni | UKR | 45.43 | 28.30 | 0.76 |
| Tyaginka | UKR | 46.75 | 33.05 | 0.56 |
| Zaporozhye | UKR | 47.83 | 35.17 | 0.58 |
| Albany | USA | 42.65 | -73.75 | 0.45 |
| Allyns Point | USA | 41.43 | -72.07 | 0.72 |
| Alpena | USA | 45.05 | -83.43 | 0.40 |
| Alsen | USA | 42.18 | -73.92 | 0.41 |
| Ashland | USA | 46.58 | -90.90 | 0.44 |
| Ashtabula | USA | 41.92 | -80.82 | 0.47 |
| Bangor | USA | 44.80 | -68.78 | 0.15 |
| Bath | USA | 43.90 | -69.82 | 0.50 |
| Bay City | USA | 43.58 | -83.88 | 0.34 |
| Bayfield | USA | 46.80 | -90.80 | 0.54 |
| Belfast | USA | 44.42 | -69.00 | 0.75 |
| Benton Harbour | USA | 42.12 | -86.45 | 0.40 |
| Beverly | USA | 46.82 | -119.92 | 0.76 |
| Brevort | USA | 46.00 | -85.03 | 0.44 |
| Buchanan | USA | 41.20 | -73.92 | 0.77 |
| Bucksport | USA | 44.57 | -68.80 | 0.47 |
| Buffalo | USA | 42.88 | -78.88 | 0.43 |
| Buffington | USA | 41.63 | -87.42 | 0.37 |
| Burlington (NJ) | USA | 40.08 | -74.85 | 1.01 |
| Burns Harbour | USA | 41.63 | -87.18 | 0.38 |
| Calcite | USA | 45.40 | -83.78 | 0.49 |
| Camden (NJ | USA | 39.93 | -75.13 | 1.03 |
| Catskill | USA | 42.22 | -73.88 | 0.41 |
| Cedarville | USA | 45.98 | -84.35 | 0.59 |
| Cementon | USA | 42.13 | -73.92 | 0.46 |
| Charlevoix | USA | 45.32 | -85.22 | 0.32 |
| Cheboygan | USA | 45.67 | -84.47 | 0.45 |
| Chester (PA) | USA | 39.83 | -75.37 | 1.05 |
| Chicago | USA | 41.83 | -87.63 | 0.35 |
| Claymont | USA | 39.80 | -75.43 | 1.05 |
| Clayton | USA | 44.23 | -76.08 | 0.32 |
| Cleveland | USA | 41.52 | -81.72 | 0.53 |
| Conneaut | USA | 41.97 | -80.57 | 0.46 |
| Coxsackie | USA | 42.33 | -73.80 | 0.43 |
| Delair | USA | 40.00 | -75.03 | 1.03 |
| Delaware City | USA | 39.57 | -75.58 | 1.06 |
| Detour | USA | 45.97 | -83.88 | 0.61 |
| Detroit | USA | 42.33 | -83.03 | 0.37 |
| Duluth | USA | 46.73 | -92.15 | 0.62 |
| Eddystone | USA | 39.83 | -75.33 | 1.05 |
| Erie | USA | 42.17 | -80.08 | 0.46 |
| Escanaba | USA | 45.78 | -87.07 | 0.33 |
| Essexville | USA | 43.60 | -83.83 | 0.34 |
| Fairless Hills | USA | 40.17 | -74.88 | 1.01 |
| Fairport | USA | 41.77 | -81.32 | 0.51 |
| Ferrysburg | USA | 43.08 | -86.23 | 0.40 |
| Gary Harbour | USA | 41.60 | -87.35 | 0.37 |

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|---|---|---|---|---|
| Gloucester (NJ) | USA | 39.88 | -75.13 | 1.03 |
| Grand Haven | USA | 43.07 | -86.25 | 0.40 |
| Grand River | USA | 41.73 | -81.28 | 0.50 |
| Green Bay | USA | 44.52 | -88.00 | 0.23 |
| Groton | USA | 41.35 | -72.08 | 1.02 |
| Harbor Beach | USA | 43.83 | -82.65 | 0.37 |
| Holland (MI) | USA | 42.78 | -86.22 | 0.41 |
| Huron | USA | 41.40 | -82.58 | 0.56 |
| Hyde Park | USA | 41.78 | -73.93 | 0.47 |
| Indiana Harbour | USA | 41.67 | -87.50 | 0.37 |
| Kalama | USA | 46.02 | -122.83 | 0.98 |
| Kenosha | USA | 42.58 | -87.82 | 0.27 |
| Kewaunee | USA | 44.45 | -87.52 | 0.49 |
| Kingston | USA | 41.87 | -73.97 | 0.46 |
| Lafayette | USA | 40.40 | -86.88 | 0.75 |
| Lorain | USA | 41.47 | -82.17 | 0.55 |
| Ludington | USA | 43.97 | -86.45 | 0.57 |
| Mackinaw City | USA | 45.75 | -84.73 | 0.43 |
| Manistee | USA | 44.25 | -86.33 | 0.59 |
| Manitowoc | USA | 44.10 | -87.63 | 0.47 |
| Marblehead | USA | 41.53 | -82.72 | 0.62 |
| Marcus Hook | USA | 39.82 | -75.42 | 1.05 |
| Marine City | USA | 42.72 | -82.48 | 0.32 |
| Marinette | USA | 45.12 | -87.62 | 0.28 |
| Marquette | USA | 46.60 | -87.38 | 0.69 |
| Marysville | USA | 42.92 | -82.48 | 0.30 |
| Menominee | USA | 45.13 | -87.62 | 0.29 |
| Milton | USA | 41.60 | -73.95 | 0.59 |
| Milwaukee | USA | 43.05 | -87.87 | 0.34 |
| Monroe | USA | 41.92 | -83.33 | 0.58 |
| Mossville | USA | 40.80 | -89.57 | 0.76 |
| Muskegon | USA | 43.18 | -86.23 | 0.42 |
| New London | USA | 41.40 | -72.10 | 0.83 |
| Newburgh | USA | 41.50 | -74.08 | 0.60 |
| Ogdensburg | USA | 44.70 | -75.50 | 0.14 |
| Olympia | USA | 47.05 | -122.90 | 1.01 |
| Ontonagon | USA | 46.87 | -89.30 | 0.58 |
| Oswego | USA | 43.47 | -76.53 | 0.40 |
| Pasco | USA | 46.22 | -119.08 | 1.00 |
| Paulsboro | USA | 39.83 | -75.25 | 1.04 |
| Peekskill | USA | 41.25 | -73.92 | 0.77 |
| Pennsauken | USA | 39.97 | -75.03 | 1.03 |
| Peoria | USA | 40.68 | -89.58 | 0.76 |
| Philadelphia | USA | 39.90 | -75.13 | 1.03 |
| Pittsburgh (PA) | USA | 40.43 | -80.00 | 0.67 |
| Point Pleasant | USA | 38.88 | -82.12 | 0.91 |
| Port Dolomite | USA | 45.97 | -84.27 | 0.53 |
| Port Huron | USA | 42.98 | -82.43 | 0.29 |
| Port Inland | USA | 45.97 | -85.87 | 0.47 |
| Port Washington | USA | 43.38 | -87.87 | 0.40 |

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|---|---|---|---|---|
| Portland (OR) | USA | 45.57 | -122.73 | 0.96 |
| Poughkeepsie | USA | 41.68 | -73.88 | 0.47 |
| Providence | USA | 41.80 | -71.38 | 0.96 |
| Racine | USA | 42.73 | -87.80 | 0.27 |
| Ravena | USA | 42.47 | -73.80 | 0.43 |
| Reedy Point | USA | 39.57 | -75.57 | 1.06 |
| Rensselaer | USA | 42.65 | -73.73 | 0.45 |
| Rochester (NY) | USA | 43.28 | -77.60 | 0.32 |
| Rockport (MI) | USA | 45.20 | -83.38 | 0.48 |
| Rogers City | USA | 45.40 | -83.83 | 0.49 |
| Roseton | USA | 41.57 | -74.00 | 0.50 |
| Saginaw | USA | 43.45 | -83.92 | 0.36 |
| Salem (NJ) | USA | 39.57 | -75.47 | 1.06 |
| Sandusky | USA | 41.45 | -82.73 | 0.60 |
| Searsport | USA | 44.45 | -68.92 | 1.00 |
| Sheboygan | USA | 43.75 | -87.70 | 0.51 |
| Shippensburg | USA | 40.03 | -77.52 | 0.73 |
| Silver Bay | USA | 47.28 | -91.27 | 1.09 |
| Somerset (MA) | USA | 41.78 | -71.13 | 0.90 |
| South Brewer | USA | 44.78 | -68.78 | 0.15 |
| South Haven | USA | 42.45 | -86.25 | 0.40 |
| St. Clair | USA | 42.82 | -82.47 | 0.31 |
| St. Joseph | USA | 42.08 | -86.50 | 0.41 |
| Stoneport | USA | 45.28 | -83.43 | 0.50 |
| Stony Point | USA | 41.23 | -73.97 | 0.77 |
| Superior | USA | 46.72 | -92.08 | 0.62 |
| Taconite Harbour | USA | 47.50 | -90.92 | 1.06 |
| The Dalles | USA | 45.58 | -121.18 | 0.66 |
| Toledo | USA | 41.70 | -83.47 | 0.59 |
| Tomkins Cove | USA | 41.27 | -73.98 | 0.77 |
| Tonawanda | USA | 43.02 | -78.88 | 0.43 |
| Trenton | USA | 40.18 | -74.75 | 0.96 |
| Troutdale | USA | 45.53 | -122.38 | 0.97 |
| Troy | USA | 42.73 | -73.68 | 0.43 |
| Tullytown | USA | 40.13 | -74.82 | 0.96 |
| Two Harbors | USA | 47.02 | -91.67 | 0.94 |
| Umatilla | USA | 45.92 | -119.33 | 0.91 |
| Vancouver | USA | 45.63 | -122.67 | 0.96 |
| Waddington | USA | 44.85 | -75.20 | 0.08 |
| Warren | USA | 41.73 | -71.30 | 1.10 |
| Waukegan | USA | 42.37 | -87.83 | 0.27 |
| Westville | USA | 39.87 | -75.13 | 1.03 |
| Whitefish Point | USA | 46.75 | -84.95 | 0.71 |
| Willbridge | USA | 45.57 | -122.75 | 0.96 |
| Wilmington (DE) | USA | 39.75 | -75.50 | 1.00 |
| Winterport | USA | 44.63 | -68.85 | 0.41 |
| Wiscasset | USA | 44.00 | -69.67 | 0.50 |
| Wyandotte | USA | 42.18 | -83.15 | 0.50 |
| Yonkers | USA | 40.95 | -73.83 | 0.93 |
| Zilwaukee | USA | 43.47 | -83.92 | 0.35 |

Appendix C. List of global ports that have highest environmental similarity to Montréal. NIS originating from these ports have the highest potential for survival if introduced at Montréal.

| Name | Country | Latitude | Longitude | Environmental Distance |
|---|---|---|---|---|
| Eckero | ALD | 60.22 | 19.60 | 0.99 |
| Korneuburg | AUT | 48.37 | 16.33 | 0.54 |
| Linz | AUT | 48.32 | 14.30 | 0.54 |
| Vienna | AUT | 48.22 | 16.37 | 0.57 |
| Antwerp | BEL | 51.24 | 4.41 | 0.89 |
| Baasrode | BEL | 51.05 | 4.17 | 0.90 |
| Balen | BEL | 51.17 | 5.17 | 0.85 |
| Boom | BEL | 51.08 | 4.37 | 0.87 |
| Brussels | BEL | 50.83 | 4.32 | 0.88 |
| Buggenhout | BEL | 51.02 | 4.20 | 0.88 |
| Burcht | BEL | 51.20 | 4.33 | 0.90 |
| Chatelineau | BEL | 50.42 | 4.52 | 0.84 |
| Dendermonde | BEL | 51.03 | 4.12 | 0.90 |
| Doel | BEL | 51.32 | 4.27 | 0.92 |
| Engis | BEL | 50.58 | 5.40 | 0.83 |
| Ertvelde | BEL | 51.20 | 3.78 | 0.94 |
| Geel | BEL | 51.15 | 4.97 | 0.85 |
| Genk | BEL | 50.94 | 5.50 | 0.85 |
| Ghent | BEL | 51.09 | 3.75 | 0.92 |
| Grimbergen | BEL | 50.93 | 4.37 | 0.86 |
| Grobbendonk | BEL | 51.20 | 4.75 | 0.87 |
| Haren | BEL | 50.90 | 4.38 | 0.86 |
| Hemiksem | BEL | 51.15 | 4.34 | 0.87 |
| Hermalle sous Huy | BEL | 50.55 | 5.37 | 0.83 |
| Hingene | BEL | 51.12 | 4.27 | 0.88 |
| Hoboken | BEL | 51.17 | 4.33 | 0.88 |
| Humbeek | BEL | 50.97 | 4.38 | 0.86 |
| Kallo | BEL | 51.25 | 4.28 | 0.91 |
| Kapelle op den Bos | BEL | 51.02 | 4.37 | 0.87 |
| Kruibeke | BEL | 51.17 | 4.32 | 0.88 |
| Kwaadmechelen | BEL | 51.10 | 5.15 | 0.85 |
| Lanaken | BEL | 50.88 | 5.65 | 0.85 |
| Langerbrugge | BEL | 51.12 | 3.75 | 0.92 |
| Liefkenshoek | BEL | 51.30 | 4.28 | 0.92 |
| Liege | BEL | 50.64 | 5.57 | 0.83 |
| Lillo | BEL | 51.30 | 4.30 | 0.92 |
| Lixhe | BEL | 50.73 | 5.70 | 0.84 |
| Maasmechelen | BEL | 50.97 | 5.70 | 0.85 |
| Marly | BEL | 50.88 | 4.38 | 0.86 |
| Mechelen | BEL | 51.03 | 4.47 | 0.87 |
| Melle | BEL | 51.00 | 3.80 | 0.90 |
| Merksem | BEL | 51.23 | 4.48 | 0.88 |
| Nameche | BEL | 50.47 | 4.98 | 0.84 |
| Niel | BEL | 51.12 | 4.33 | 0.88 |
| Olen | BEL | 51.15 | 4.87 | 0.85 |

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|---|---|---|---|---|
| Puurs | BEL | 51.07 | 4.27 | 0.88 |
| Rieme | BEL | 51.17 | 3.77 | 0.92 |
| Ruisbroek | BEL | 50.78 | 4.28 | 0.88 |
| Rumst | BEL | 51.07 | 4.42 | 0.87 |
| Rupelmonde | BEL | 51.13 | 4.28 | 0.88 |
| Schelle | BEL | 51.13 | 4.32 | 0.88 |
| Schoten | BEL | 51.25 | 4.50 | 0.88 |
| Seilles | BEL | 50.50 | 5.08 | 0.85 |
| Sint-Kruis-Winkel | BEL | 51.15 | 3.80 | 0.92 |
| Temse | BEL | 51.13 | 4.22 | 0.88 |
| Terdonk | BEL | 51.15 | 3.78 | 0.92 |
| Terhagen | BEL | 51.08 | 4.38 | 0.87 |
| Tessenderlo | BEL | 51.07 | 5.08 | 0.85 |
| Tielrode | BEL | 51.12 | 4.22 | 0.88 |
| Tisselt | BEL | 51.03 | 4.37 | 0.87 |
| Val St. Lambert | BEL | 50.57 | 5.47 | 0.83 |
| Verbrande Brug | BEL | 50.95 | 4.38 | 0.86 |
| Vilvoorde | BEL | 50.95 | 4.42 | 0.86 |
| Willebroek | BEL | 51.05 | 4.35 | 0.87 |
| Wintham | BEL | 51.10 | 4.28 | 0.88 |
| Wondelgem | BEL | 51.08 | 3.72 | 0.92 |
| Zelzate | BEL | 51.20 | 3.80 | 0.94 |
| Zutendaal | BEL | 50.92 | 5.57 | 0.85 |
| Zwyndrecht | BEL | 51.22 | 4.33 | 0.90 |
| Kozloduy | BGR | 43.78 | 23.72 | 0.76 |
| Lom | BGR | 43.83 | 23.20 | 0.69 |
| Rousse | BGR | 43.83 | 25.97 | 0.68 |
| Silistra | BGR | 44.10 | 27.25 | 0.69 |
| Amherstburg | CAN | 42.10 | -83.08 | 0.40 |
| Baddeck | CAN | 46.10 | -60.73 | 0.92 |
| Bath | CAN | 44.17 | -76.77 | 0.19 |
| Batiscan | CAN | 46.52 | -72.23 | 0.40 |
| Bayside | CAN | 45.17 | -67.13 | 0.94 |
| Becancour | CAN | 46.40 | -72.38 | 0.32 |
| Belleville | CAN | 44.13 | -77.37 | 0.21 |
| Bowmanville | CAN | 43.90 | -78.67 | 0.35 |
| Boylston | CAN | 45.45 | -61.52 | 1.05 |
| Britt | CAN | 45.77 | -80.58 | 0.51 |
| Brockville | CAN | 44.60 | -75.63 | 0.06 |
| Bronte | CAN | 43.40 | -79.70 | 0.35 |
| Bruce Mines | CAN | 46.27 | -83.72 | 0.73 |
| Burlington | CAN | 43.32 | -79.75 | 0.30 |
| Cardinal | CAN | 44.78 | -75.33 | 0.05 |
| Chicoutimi | CAN | 48.43 | -71.08 | 0.54 |
| Clarkson | CAN | 43.50 | -79.60 | 0.34 |
| Cobourg | CAN | 43.95 | -78.17 | 0.25 |
| Colborne | CAN | 44.00 | -77.88 | 0.23 |
| Collingwood | CAN | 44.50 | -80.23 | 0.37 |
| Contrecoeur | CAN | 45.88 | -73.20 | 0.17 |
| Cornwall | CAN | 45.02 | -74.72 | 0.03 |

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|---|---|---|---|---|
| Corunna | CAN | 42.88 | -82.45 | 0.25 |
| Cote Ste-Catherine | CAN | 45.41 | -73.58 | 0.03 |
| Country Harbour | CAN | 45.22 | -61.73 | 1.08 |
| Courtright | CAN | 42.80 | -82.45 | 0.27 |
| Erieau | CAN | 42.25 | -81.93 | 0.33 |
| Fort Erie | CAN | 42.93 | -78.95 | 0.30 |
| Fredericton | CAN | 45.95 | -66.65 | 0.36 |
| Gananoque | CAN | 44.32 | -76.15 | 0.19 |
| Goderich | CAN | 43.75 | -81.75 | 0.41 |
| Gold River | CAN | 49.68 | -126.12 | 1.10 |
| Grondines | CAN | 46.75 | -72.03 | 0.52 |
| Hamilton | CAN | 43.23 | -79.85 | 0.35 |
| Humberstone | CAN | 42.90 | -79.25 | 0.28 |
| Iona | CAN | 45.97 | -60.80 | 0.65 |
| Killarney | CAN | 45.97 | -81.52 | 0.63 |
| Kingston | CAN | 44.20 | -76.50 | 0.18 |
| Kingsville | CAN | 42.02 | -82.72 | 0.42 |
| Kitimat | CAN | 54.00 | -128.70 | 0.98 |
| Lanoraie | CAN | 45.97 | -73.18 | 0.17 |
| Lauzon | CAN | 46.82 | -71.15 | 0.43 |
| Leamington | CAN | 42.05 | -82.62 | 0.42 |
| Levis | CAN | 46.82 | -71.18 | 0.34 |
| Little Current | CAN | 45.97 | -81.92 | 0.33 |
| Little Narrows | CAN | 45.98 | -60.98 | 0.60 |
| Long Sault | CAN | 45.02 | -74.90 | 0.10 |
| Meldrum Bay | CAN | 45.92 | -83.10 | 0.70 |
| Michipicoten Harbour | CAN | 47.95 | -84.92 | 0.97 |
| Midland | CAN | 44.75 | -79.93 | 0.39 |
| Montréal | CAN | 45.50 | -73.55 | 0.00 |
| Mooretown | CAN | 42.85 | -82.47 | 0.25 |
| Morrisburg | CAN | 44.93 | -75.18 | 0.11 |
| Nanticoke | CAN | 42.82 | -80.07 | 0.25 |
| Oakville | CAN | 43.43 | -79.67 | 0.36 |
| Oshawa | CAN | 43.87 | -78.83 | 0.37 |
| Ottawa | CAN | 45.40 | -75.70 | 0.12 |
| Owen Sound | CAN | 44.58 | -80.95 | 0.43 |
| Parry Sound | CAN | 45.37 | -80.05 | 0.40 |
| Pelee Island | CAN | 41.75 | -82.67 | 0.46 |
| Picton | CAN | 44.00 | -77.13 | 0.20 |
| Pointe aux Trembles | CAN | 45.63 | -73.48 | 0.08 |
| Port Alberni | CAN | 49.23 | -125.00 | 1.05 |
| Port Burwell | CAN | 42.63 | -80.80 | 0.27 |
| Port Colborne | CAN | 42.87 | -79.25 | 0.29 |
| Port Credit | CAN | 43.55 | -79.60 | 0.41 |
| Port Dalhousie | CAN | 43.20 | -79.27 | 0.29 |
| Port Dover | CAN | 42.78 | -80.20 | 0.23 |
| Port Hope | CAN | 43.95 | -78.28 | 0.27 |
| Port Maitland | CAN | 42.87 | -79.58 | 0.27 |
| Port McNicoll | CAN | 44.75 | -79.80 | 0.33 |
| Port Stanley | CAN | 42.67 | -81.22 | 0.25 |

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|---|---|---|---|---|
| Port Weller | CAN | 43.23 | -79.22 | 0.27 |
| Prescott | CAN | 44.72 | -75.52 | 0.06 |
| Québec | CAN | 46.82 | -71.20 | 0.34 |
| Sarnia | CAN | 42.98 | -82.42 | 0.26 |
| Sault Ste. Marie | CAN | 46.52 | -84.33 | 0.66 |
| Sombra | CAN | 42.70 | -82.47 | 0.27 |
| Sorel | CAN | 46.05 | -73.12 | 0.15 |
| Spragge | CAN | 46.22 | -82.67 | 0.50 |
| St. Catharines | CAN | 43.17 | -79.27 | 0.28 |
| St. Romuald | CAN | 46.75 | -71.23 | 0.34 |
| St. Stephen | CAN | 45.20 | -67.28 | 0.55 |
| Ste. Croix | CAN | 46.63 | -71.73 | 0.40 |
| Thessalon | CAN | 46.25 | -83.55 | 0.71 |
| Thorold | CAN | 43.08 | -79.17 | 0.26 |
| Three Rivers | CAN | 46.35 | -72.55 | 0.30 |
| Tobermory | CAN | 45.23 | -81.65 | 0.68 |
| Toronto | CAN | 43.63 | -79.38 | 0.40 |
| Tracy | CAN | 46.02 | -73.17 | 0.19 |
| Valleyfield | CAN | 45.22 | -74.08 | 0.05 |
| Wallaceburg | CAN | 42.60 | -82.40 | 0.27 |
| Welland | CAN | 42.97 | -79.22 | 0.24 |
| Weymouth | CAN | 44.45 | -66.02 | 1.01 |
| Wheatley | CAN | 42.08 | -82.43 | 0.33 |
| Whitby | CAN | 43.85 | -78.92 | 0.41 |
| Windsor | CAN | 42.32 | -83.05 | 0.22 |
| Basle | CHE | 47.55 | 7.57 | 0.65 |
| Dandong | CHN | 40.13 | 124.40 | 0.82 |
| Fujin | CHN | 47.25 | 132.02 | 0.41 |
| Harbin | CHN | 45.73 | 126.60 | 0.38 |
| Heihe | CHN | 50.23 | 127.47 | 0.65 |
| Jiamusi | CHN | 46.80 | 130.35 | 0.39 |
| Panjin | CHN | 41.12 | 122.07 | 0.63 |
| Panshi | CHN | 42.92 | 126.03 | 0.28 |
| Tongjiang | CHN | 47.63 | 132.50 | 0.44 |
| Chvaletice | CZE | 50.02 | 15.43 | 0.56 |
| Usti nad Labem | CZE | 50.67 | 14.03 | 0.59 |
| Aken | DEU | 51.85 | 12.03 | 0.66 |
| Andernach | DEU | 50.42 | 7.38 | 0.75 |
| Anklam | DEU | 53.87 | 13.68 | 0.88 |
| Aschaffenburg | DEU | 49.95 | 9.17 | 0.66 |
| Barth | DEU | 54.37 | 12.73 | 0.95 |
| Bendorf | DEU | 50.42 | 7.58 | 0.75 |
| Berlin | DEU | 52.53 | 13.42 | 0.61 |
| Berne | DEU | 53.18 | 10.50 | 0.79 |
| Bingen | DEU | 49.95 | 7.90 | 0.70 |
| Bodenwerder | DEU | 51.97 | 9.50 | 0.80 |
| Boizenburg | DEU | 53.38 | 10.73 | 0.79 |
| Bonn | DEU | 50.72 | 7.08 | 0.79 |
| Brandenburg | DEU | 52.40 | 12.52 | 0.65 |
| Braunschweig | DEU | 52.25 | 10.50 | 0.75 |

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|---|---|---|---|---|
| Brohl | DEU | 50.42 | 7.30 | 0.78 |
| Castrop Rauxel | DEU | 51.55 | 7.30 | 0.84 |
| Cologne | DEU | 50.93 | 7.00 | 0.81 |
| Deggendorf | DEU | 48.83 | 12.97 | 0.56 |
| Dormagen | DEU | 51.10 | 6.95 | 0.83 |
| Dortmund | DEU | 51.53 | 7.45 | 0.83 |
| Duisburg | DEU | 51.43 | 6.75 | 0.85 |
| Dusseldorf | DEU | 51.25 | 6.77 | 0.84 |
| Eisenhuttenstadt | DEU | 52.15 | 14.62 | 0.53 |
| Emmerich | DEU | 51.85 | 6.25 | 0.89 |
| Erftstadt | DEU | 50.80 | 6.75 | 0.80 |
| Essen | DEU | 51.45 | 7.02 | 0.83 |
| Frankfurt | DEU | 50.12 | 8.67 | 0.66 |
| Geesthacht | DEU | 53.43 | 10.38 | 0.80 |
| Gelsenkirchen | DEU | 51.50 | 7.08 | 0.83 |
| Germersheim | DEU | 49.22 | 8.38 | 0.69 |
| Gernsheim | DEU | 49.75 | 8.47 | 0.68 |
| Greifswald | DEU | 54.10 | 13.38 | 0.97 |
| Haren | DEU | 52.80 | 7.25 | 0.94 |
| Havelberg | DEU | 52.83 | 12.07 | 0.69 |
| Heringsdorf | DEU | 53.97 | 14.17 | 0.83 |
| Hohenhorn | DEU | 53.47 | 10.37 | 0.80 |
| Homberg | DEU | 51.45 | 6.72 | 0.85 |
| Hoya | DEU | 52.80 | 9.13 | 0.80 |
| Ibbenburen | DEU | 52.28 | 7.73 | 0.85 |
| Karlsruhe | DEU | 49.05 | 8.33 | 0.69 |
| Kehl | DEU | 48.58 | 7.83 | 0.69 |
| Koblenz | DEU | 50.33 | 7.58 | 0.75 |
| Krefeld | DEU | 51.33 | 6.57 | 0.85 |
| Kroslin | DEU | 54.13 | 13.75 | 1.06 |
| Ladebow | DEU | 54.10 | 13.45 | 0.97 |
| Lahnstein | DEU | 50.30 | 7.62 | 0.75 |
| Lauenburg | DEU | 53.38 | 10.55 | 0.79 |
| Lauterbach | DEU | 54.33 | 13.52 | 1.09 |
| Leer | DEU | 53.22 | 7.45 | 0.95 |
| Leeseringen | DEU | 52.58 | 9.13 | 0.79 |
| Leverkusen | DEU | 51.02 | 7.03 | 0.82 |
| Lubmin | DEU | 54.12 | 13.60 | 0.94 |
| Ludwigshafen am Rhein | DEU | 49.47 | 8.45 | 0.69 |
| Magdeburg | DEU | 52.13 | 11.62 | 0.67 |
| Mainz | DEU | 50.00 | 8.28 | 0.68 |
| Mannheim | DEU | 49.48 | 8.47 | 0.69 |
| Minden | DEU | 52.30 | 8.90 | 0.79 |
| Monheim | DEU | 51.12 | 6.82 | 0.83 |
| Moselkern | DEU | 50.18 | 7.37 | 0.75 |
| Mulheim | DEU | 50.95 | 7.05 | 0.80 |
| Neckarsteinach | DEU | 49.43 | 8.80 | 0.66 |
| Neuss | DEU | 51.20 | 6.70 | 0.84 |
| Neuss/Dusseldorf | DEU | 51.20 | 6.70 | 0.84 |
| Neuwied | DEU | 50.43 | 7.48 | 0.75 |

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|---|---|---|---|---|
| Nienburg | DEU | 52.63 | 9.22 | 0.79 |
| Nuremberg | DEU | 49.45 | 11.05 | 0.62 |
| Orsoy | DEU | 51.53 | 6.68 | 0.86 |
| Osnabruck | DEU | 52.27 | 8.03 | 0.83 |
| Papenburg | DEU | 53.08 | 7.38 | 0.89 |
| Passau | DEU | 48.58 | 13.47 | 0.59 |
| Peenemunde | DEU | 54.12 | 13.77 | 1.06 |
| Peine | DEU | 52.32 | 10.22 | 0.76 |
| Porz | DEU | 50.88 | 7.05 | 0.80 |
| Regensburg | DEU | 49.02 | 12.12 | 0.59 |
| Remagen | DEU | 50.57 | 7.22 | 0.77 |
| Rheinhausen | DEU | 51.42 | 6.73 | 0.85 |
| Rinteln | DEU | 52.20 | 9.08 | 0.79 |
| Rosslau | DEU | 51.90 | 12.27 | 0.66 |
| Rostock | DEU | 54.15 | 12.10 | 0.96 |
| Ruhrort | DEU | 51.45 | 6.73 | 0.85 |
| Salzgitter | DEU | 52.22 | 10.33 | 0.76 |
| Speyer | DEU | 49.30 | 8.43 | 0.69 |
| Stralsund | DEU | 54.32 | 13.10 | 0.97 |
| Sturzelberg | DEU | 51.12 | 6.80 | 0.83 |
| Stuttgart | DEU | 48.78 | 9.20 | 0.66 |
| Tangermunde | DEU | 52.57 | 11.97 | 0.69 |
| Ueckermunde | DEU | 53.73 | 14.28 | 1.02 |
| Urdingen | DEU | 51.35 | 6.67 | 0.86 |
| Vallendar | DEU | 50.40 | 7.62 | 0.75 |
| Vierow | DEU | 54.10 | 13.57 | 0.94 |
| Walsum | DEU | 51.53 | 6.68 | 0.86 |
| Warnemunde | DEU | 54.18 | 12.08 | 0.97 |
| Weissenthurm | DEU | 50.42 | 7.48 | 0.75 |
| Wesel | DEU | 51.65 | 6.60 | 0.86 |
| Wesseling | DEU | 50.83 | 7.00 | 0.80 |
| Wolgast | DEU | 54.05 | 13.78 | 1.06 |
| Worms | DEU | 49.63 | 8.35 | 0.68 |
| Wurzburg | DEU | 49.78 | 9.93 | 0.68 |
| Gudhjem | DNK | 55.22 | 14.97 | 1.02 |
| Hvalpsund | DNK | 56.68 | 9.20 | 0.94 |
| Logstor | DNK | 56.97 | 9.25 | 0.94 |
| Nekso | DNK | 55.07 | 15.15 | 1.10 |
| Skarrehage | DNK | 56.95 | 8.87 | 1.10 |
| Skive | DNK | 56.57 | 9.03 | 0.95 |
| Svaneke | DNK | 55.13 | 15.15 | 1.10 |
| Thisted | DNK | 56.95 | 8.70 | 1.01 |
| Bekker | EST | 59.45 | 24.67 | 0.87 |
| Forby | EST | 59.00 | 23.17 | 1.09 |
| Haapsalu | EST | 58.95 | 23.53 | 0.86 |
| Heltermaa | EST | 58.87 | 23.07 | 0.96 |
| Kuivastu | EST | 58.58 | 23.40 | 0.94 |
| Kunda | EST | 59.52 | 26.55 | 1.10 |
| Loksa | EST | 59.58 | 25.72 | 1.10 |
| Meeruse | EST | 59.45 | 24.68 | 0.85 |

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|---|---|---|---|---|
| Montu | EST | 57.95 | 22.12 | 0.99 |
| Narva Joesuu | EST | 59.47 | 28.05 | 0.82 |
| Paljassaare | EST | 59.45 | 24.70 | 0.85 |
| Parnu | EST | 58.38 | 24.48 | 0.77 |
| Peetri | EST | 59.45 | 24.73 | 0.85 |
| Prangli Island | EST | 59.63 | 25.00 | 1.10 |
| Rohukula | EST | 58.90 | 23.42 | 0.96 |
| Roomassaare | EST | 58.22 | 22.52 | 0.94 |
| Saaremaa Harbour | EST | 58.53 | 22.23 | 0.99 |
| Sillamae | EST | 59.40 | 27.78 | 0.82 |
| Tallinn | EST | 59.45 | 24.75 | 0.85 |
| Veere | EST | 58.45 | 22.05 | 0.92 |
| Virtsu | EST | 58.58 | 23.55 | 0.85 |
| Dalsbruk | FIN | 60.03 | 22.52 | 0.89 |
| Hamina | FIN | 60.57 | 27.18 | 0.79 |
| Helsinki | FIN | 60.17 | 24.95 | 0.78 |
| Imatra | FIN | 61.17 | 28.83 | 0.72 |
| Inkoo | FIN | 60.05 | 24.02 | 0.97 |
| Isnas | FIN | 60.40 | 26.00 | 0.86 |
| Joensuu | FIN | 62.60 | 29.75 | 0.86 |
| Joutseno | FIN | 61.13 | 28.48 | 0.72 |
| Kantvik | FIN | 60.08 | 24.38 | 0.95 |
| Kaukas | FIN | 61.07 | 28.22 | 0.72 |
| Kaukopaa | FIN | 61.25 | 28.87 | 0.77 |
| Kokkila | FIN | 60.33 | 22.87 | 0.91 |
| Kotka | FIN | 60.47 | 26.95 | 1.05 |
| Kristiinankaupunki | FIN | 62.27 | 21.32 | 0.94 |
| Kronvik | FIN | 63.05 | 21.52 | 1.00 |
| Kuopio | FIN | 62.85 | 27.50 | 0.81 |
| Kustavi | FIN | 60.57 | 21.33 | 0.95 |
| Kuuslahti | FIN | 63.12 | 27.75 | 0.79 |
| Lapaluoto | FIN | 64.67 | 24.42 | 1.10 |
| Lappeenranta | FIN | 61.07 | 28.25 | 0.72 |
| Lauritsala | FIN | 61.08 | 28.33 | 0.72 |
| Loviisa | FIN | 60.45 | 26.23 | 0.83 |
| Luvia | FIN | 61.33 | 21.57 | 0.95 |
| Mantyluoto | FIN | 61.58 | 21.50 | 0.95 |
| Martinniemi | FIN | 65.22 | 25.28 | 1.07 |
| Maxmo | FIN | 63.20 | 22.03 | 1.03 |
| Merikarvia | FIN | 61.85 | 21.47 | 0.99 |
| Mjosund | FIN | 60.22 | 22.47 | 0.87 |
| Mustola | FIN | 61.07 | 28.30 | 0.72 |
| Naantali | FIN | 60.47 | 22.02 | 0.88 |
| Nyhamn | FIN | 62.17 | 21.33 | 0.94 |
| Olkiluoto | FIN | 61.25 | 21.50 | 0.92 |
| Oulu | FIN | 65.00 | 25.47 | 1.03 |
| Parainen | FIN | 60.28 | 22.30 | 0.88 |
| Pateniemi | FIN | 65.08 | 25.40 | 1.05 |
| Perno | FIN | 60.45 | 26.05 | 0.85 |
| Pori | FIN | 61.48 | 21.80 | 0.97 |

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|---|---|---|---|---|
| Puhos | FIN | 62.10 | 29.92 | 0.83 |
| Rahja | FIN | 64.20 | 23.73 | 1.10 |
| Rauma | FIN | 61.13 | 21.50 | 0.94 |
| Ristiina | FIN | 61.53 | 27.42 | 0.80 |
| Salo | FIN | 60.38 | 23.17 | 0.93 |
| Savonlinna | FIN | 61.90 | 28.92 | 0.78 |
| Siilinjarvi | FIN | 63.08 | 27.67 | 0.80 |
| Sipoo | FIN | 60.37 | 25.32 | 0.87 |
| Skoldvik | FIN | 60.30 | 25.55 | 0.84 |
| Skuru | FIN | 60.10 | 23.55 | 0.94 |
| Stromma | FIN | 60.18 | 22.90 | 0.91 |
| Summa | FIN | 60.53 | 27.12 | 0.79 |
| Svartback | FIN | 60.28 | 25.53 | 0.84 |
| Taalintehdas | FIN | 60.02 | 22.52 | 0.89 |
| Tammisaari | FIN | 59.98 | 23.43 | 0.91 |
| Teijo | FIN | 60.25 | 22.95 | 0.91 |
| Tolkkinen | FIN | 60.33 | 25.58 | 0.84 |
| Tupavuori | FIN | 60.45 | 22.07 | 0.88 |
| Turku | FIN | 60.43 | 22.22 | 0.87 |
| Uusikaupunki | FIN | 60.80 | 21.40 | 0.94 |
| Vaasa | FIN | 63.10 | 21.62 | 1.00 |
| Valkom | FIN | 60.42 | 26.27 | 0.83 |
| Varkaus | FIN | 62.33 | 27.83 | 0.77 |
| Vartsala | FIN | 60.33 | 23.02 | 0.93 |
| Vastanfjard | FIN | 60.05 | 22.65 | 0.89 |
| Annay sous Lens | FRA | 50.47 | 2.87 | 0.94 |
| Bethune | FRA | 50.53 | 2.63 | 0.99 |
| Bonnieres | FRA | 49.03 | 1.58 | 0.94 |
| Chalon-sur-Saone | FRA | 46.78 | 4.83 | 0.75 |
| Conflans | FRA | 48.98 | 2.10 | 0.92 |
| Duclair | FRA | 49.45 | 0.87 | 1.02 |
| Elbeuf | FRA | 49.28 | 1.12 | 0.99 |
| Gaillon | FRA | 49.17 | 1.32 | 0.96 |
| Grand Couronne | FRA | 49.37 | 0.98 | 1.02 |
| Grigny | FRA | 45.62 | 4.78 | 0.79 |
| Ingrandes | FRA | 47.40 | -0.92 | 1.04 |
| La Mailleraye | FRA | 49.48 | 0.77 | 1.03 |
| Le Pouzin | FRA | 44.75 | 4.75 | 0.97 |
| Le Trait | FRA | 49.47 | 0.80 | 1.03 |
| Les Andelys | FRA | 49.25 | 1.43 | 0.97 |
| Lille | FRA | 50.65 | 3.08 | 0.94 |
| Lillebonne | FRA | 49.52 | 0.53 | 1.08 |
| Limay | FRA | 48.97 | 1.78 | 0.92 |
| Lyon | FRA | 45.77 | 4.83 | 0.79 |
| Mantes | FRA | 48.98 | 1.72 | 0.92 |
| Nantes | FRA | 47.23 | -1.57 | 1.08 |
| Nort-sur-Erdre | FRA | 47.43 | -1.50 | 1.07 |
| Paris | FRA | 48.87 | 2.33 | 0.94 |
| Petit Couronne | FRA | 49.37 | 1.00 | 1.02 |
| Port Jerome | FRA | 49.47 | 0.53 | 1.08 |

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|---|---|---|---|---|
| Radicatel | FRA | 49.42 | 0.48 | 1.09 |
| Rouen | FRA | 49.48 | 1.08 | 1.01 |
| St. Etienne du Rouvray | FRA | 49.37 | 1.12 | 1.01 |
| St. Wandrille | FRA | 49.53 | 0.75 | 1.04 |
| Strasbourg | FRA | 48.57 | 7.70 | 0.69 |
| Vernon | FRA | 49.08 | 1.48 | 0.95 |
| Villeneuve-la-Garenne | FRA | 48.92 | 2.30 | 0.94 |
| Villeneuve-le-Roi | FRA | 48.73 | 2.40 | 0.94 |
| Villequier | FRA | 49.50 | 0.67 | 1.05 |
| Althorpe Wharf | GBR | 53.57 | -0.73 | 1.09 |
| Aylesford | GBR | 51.27 | 0.47 | 1.10 |
| Beckingham | GBR | 53.40 | -0.83 | 1.08 |
| Burton upon Stather | GBR | 53.65 | -0.68 | 1.10 |
| Drax | GBR | 53.73 | -0.98 | 1.09 |
| Flixborough | GBR | 53.62 | -0.68 | 1.09 |
| Gainsborough | GBR | 53.40 | -0.77 | 1.07 |
| Gloucester | GBR | 51.87 | -2.22 | 1.06 |
| Grove Wharf | GBR | 53.60 | -0.68 | 1.09 |
| Gunness | GBR | 53.58 | -0.72 | 1.09 |
| Gunness Wharf | GBR | 53.58 | -0.68 | 1.09 |
| Halling | GBR | 51.37 | 0.01 | 1.04 |
| Keadby | GBR | 53.60 | -0.67 | 1.09 |
| London | GBR | 51.50 | -0.07 | 1.04 |
| Neap House | GBR | 53.62 | -0.67 | 1.09 |
| Selby | GBR | 53.78 | -1.07 | 1.10 |
| Thorne | GBR | 53.62 | -0.97 | 1.07 |
| Budapest | HUN | 47.50 | 19.03 | 0.64 |
| Adria | ITA | 45.05 | 12.07 | 1.02 |
| Boretto | ITA | 44.90 | 10.55 | 0.97 |
| Cremona | ITA | 45.13 | 10.02 | 0.92 |
| Donada | ITA | 45.05 | 12.22 | 1.03 |
| Pavia | ITA | 45.18 | 9.13 | 0.93 |
| Klaipeda | LTU | 55.72 | 21.13 | 0.85 |
| Engure | LVA | 57.17 | 23.23 | 1.02 |
| Labrags | LVA | 56.98 | 21.37 | 1.08 |
| Liepaja | LVA | 56.52 | 21.02 | 0.96 |
| Mersrags | LVA | 57.37 | 23.13 | 0.96 |
| Pavilosta | LVA | 56.90 | 21.18 | 0.95 |
| Riga | LVA | 56.97 | 24.10 | 0.78 |
| Roja | LVA | 57.50 | 22.82 | 0.94 |
| Salacgriva | LVA | 57.75 | 24.37 | 0.84 |
| Skulte | LVA | 57.32 | 24.40 | 0.81 |
| Ventspils | LVA | 57.40 | 21.55 | 0.98 |
| Chisinau | MDA | 47.02 | 28.83 | 0.46 |
| Aalst | NLD | 51.38 | 5.45 | 0.88 |
| Alblasserdam | NLD | 51.87 | 4.62 | 0.84 |
| Ameide | NLD | 51.95 | 4.95 | 0.82 |
| Amsterdam | NLD | 52.37 | 4.90 | 1.10 |
| Arnhem | NLD | 51.97 | 5.88 | 0.90 |
| Assen | NLD | 53.00 | 6.57 | 0.96 |

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|---|---|---|---|---|
| Axel Sassing | NLD | 51.28 | 3.87 | 1.01 |
| Bergambacht | NLD | 51.93 | 4.78 | 0.82 |
| Bergen-op-Zoom | NLD | 51.50 | 4.27 | 1.05 |
| Bolnes | NLD | 51.90 | 4.57 | 0.84 |
| Bruinisse | NLD | 51.67 | 4.10 | 0.99 |
| Capelle aan den Yssel | NLD | 51.92 | 4.57 | 0.84 |
| Culemborg | NLD | 51.95 | 5.22 | 0.90 |
| Deest | NLD | 51.88 | 5.67 | 0.90 |
| Den Bommel | NLD | 51.72 | 4.28 | 0.99 |
| Dintelmond | NLD | 51.67 | 4.38 | 0.94 |
| Dinteloord | NLD | 51.63 | 4.37 | 0.94 |
| Dodewaard | NLD | 51.90 | 5.63 | 0.90 |
| Dordrecht | NLD | 51.80 | 4.65 | 0.84 |
| Druten | NLD | 51.88 | 5.62 | 0.90 |
| Eindhoven | NLD | 51.43 | 5.50 | 0.88 |
| Fijnaart | NLD | 51.63 | 4.48 | 0.93 |
| Geertruidenberg | NLD | 51.72 | 4.87 | 0.91 |
| Gendt | NLD | 51.87 | 5.98 | 0.90 |
| Gorinchem | NLD | 51.82 | 4.98 | 0.91 |
| Grave | NLD | 51.75 | 5.75 | 0.90 |
| Groot-Ammers | NLD | 51.92 | 4.83 | 0.82 |
| Hardinxveld | NLD | 51.82 | 4.85 | 0.82 |
| Heerewaarden | NLD | 51.82 | 5.38 | 0.90 |
| Heerjansdam | NLD | 51.83 | 4.57 | 0.84 |
| Heijen | NLD | 51.68 | 5.98 | 0.89 |
| Hellevoetsluis | NLD | 51.82 | 4.13 | 1.09 |
| Hendrik Ido Ambacht | NLD | 51.85 | 4.62 | 0.84 |
| Heusden | NLD | 51.73 | 5.15 | 0.91 |
| Huissen | NLD | 51.92 | 5.92 | 0.90 |
| Kinderdijk | NLD | 51.88 | 4.63 | 0.84 |
| Krimpen aan den Yssel | NLD | 51.90 | 4.58 | 0.84 |
| Lekkerkerk | NLD | 51.92 | 4.63 | 0.84 |
| Lithoyen | NLD | 51.82 | 5.43 | 0.90 |
| Lobith | NLD | 51.87 | 6.13 | 0.89 |
| Maasbracht | NLD | 51.13 | 5.87 | 0.85 |
| Maashees | NLD | 51.57 | 6.03 | 0.89 |
| Maassluis | NLD | 51.92 | 4.25 | 0.91 |
| Maastricht | NLD | 50.85 | 5.68 | 0.85 |
| Made | NLD | 51.68 | 4.80 | 0.92 |
| Middelharnis | NLD | 51.78 | 4.20 | 1.03 |
| Millingen aan den Rijn | NLD | 51.87 | 6.03 | 0.89 |
| Moerdijk | NLD | 51.70 | 4.62 | 0.95 |
| Nieuw Lekkerland | NLD | 51.88 | 4.63 | 0.84 |
| Nieuwerkerk aan den Yssel | NLD | 51.97 | 4.58 | 0.84 |
| Nijmegen | NLD | 51.83 | 5.83 | 0.90 |
| Numansdorp | NLD | 51.72 | 4.42 | 0.98 |
| Ooltgensplaat | NLD | 51.68 | 4.33 | 0.96 |
| Oosterhout | NLD | 51.62 | 4.87 | 0.90 |
| Oss | NLD | 51.77 | 5.52 | 0.90 |
| Ouderkerk | NLD | 51.93 | 4.60 | 0.84 |

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|---|---|---|---|---|
| Oudewater | NLD | 52.03 | 4.88 | 1.09 |
| Ouwerkerk | NLD | 51.63 | 3.98 | 1.06 |
| Overschie | NLD | 51.93 | 4.42 | 0.87 |
| Paal | NLD | 51.35 | 4.12 | 1.05 |
| Papendrecht | NLD | 51.83 | 4.63 | 0.84 |
| Raamsdonksveer | NLD | 51.70 | 4.92 | 0.91 |
| Renkum | NLD | 51.97 | 5.73 | 0.90 |
| Rhenen | NLD | 51.95 | 5.57 | 0.90 |
| Ridderkerk | NLD | 51.87 | 4.58 | 0.84 |
| Rijswijk | NLD | 51.78 | 5.02 | 0.91 |
| Roermond | NLD | 51.20 | 5.98 | 0.86 |
| Rotterdam | NLD | 51.90 | 4.48 | 0.85 |
| Sas van Ghent | NLD | 51.23 | 3.80 | 0.96 |
| Schiedam | NLD | 51.90 | 4.40 | 0.88 |
| 'sGravendeel | NLD | 51.77 | 4.60 | 0.84 |
| 'sHertogenbosch | NLD | 51.70 | 5.30 | 0.92 |
| Sliedrecht | NLD | 51.83 | 4.75 | 0.82 |
| Slikkerveer | NLD | 51.88 | 4.60 | 0.84 |
| Sluiskil | NLD | 51.30 | 3.83 | 1.01 |
| Spijk | NLD | 51.87 | 5.05 | 0.92 |
| St. Annaland | NLD | 51.62 | 4.10 | 0.91 |
| Stavenisse | NLD | 51.58 | 4.00 | 1.06 |
| Stein | NLD | 50.97 | 5.77 | 0.85 |
| Swalmen | NLD | 51.22 | 6.02 | 0.86 |
| Tegelen | NLD | 51.35 | 6.13 | 0.87 |
| Tiel | NLD | 51.88 | 5.45 | 0.90 |
| Tilburg | NLD | 51.55 | 5.07 | 0.90 |
| Venlo | NLD | 51.37 | 6.17 | 0.87 |
| Vlaardingen | NLD | 51.90 | 4.35 | 0.88 |
| Waalwijk | NLD | 51.70 | 5.07 | 0.91 |
| Wageningen | NLD | 51.97 | 5.67 | 0.90 |
| Wanssum | NLD | 51.53 | 6.08 | 0.89 |
| Wartena | NLD | 53.15 | 5.90 | 1.07 |
| Werkendam | NLD | 51.80 | 4.90 | 0.82 |
| Willemstad | NLD | 51.68 | 4.40 | 0.96 |
| Zaltbommel | NLD | 51.80 | 5.20 | 0.91 |
| Zuilichem | NLD | 51.80 | 5.12 | 0.91 |
| Zwijndrecht | NLD | 51.82 | 4.65 | 0.84 |
| Herre | NOR | 59.10 | 9.53 | 1.05 |
| Menstad | NOR | 59.17 | 9.65 | 1.00 |
| Porsgrunn | NOR | 59.13 | 9.65 | 1.05 |
| Skien | NOR | 59.20 | 9.62 | 1.08 |
| Darlowo | POL | 54.43 | 16.38 | 0.80 |
| Elblag | POL | 54.17 | 19.40 | 0.82 |
| Frombork | POL | 54.35 | 19.67 | 0.88 |
| Gdansk | POL | 54.35 | 18.65 | 1.01 |
| Gdynia | POL | 54.53 | 18.55 | 1.08 |
| Kolobrzeg | POL | 54.18 | 15.57 | 0.74 |
| Kozle | POL | 50.32 | 18.13 | 0.59 |
| Niechorze | POL | 54.10 | 15.07 | 0.78 |

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|---|---|---|---|---|
| Nowa Sol | POL | 51.80 | 15.72 | 0.51 |
| Plock | POL | 52.53 | 19.67 | 0.44 |
| Police | POL | 53.55 | 14.60 | 0.80 |
| Puck | POL | 54.72 | 18.35 | 0.94 |
| Stepnica | POL | 53.65 | 14.63 | 0.80 |
| Swinoujscie | POL | 53.93 | 14.28 | 1.02 |
| Szczecin | POL | 53.42 | 14.55 | 0.82 |
| Tczew | POL | 54.08 | 18.77 | 0.90 |
| Wladyslawowo | POL | 54.80 | 18.42 | 1.10 |
| Wroclaw | POL | 51.08 | 17.00 | 0.60 |
| Pyongyang | PRK | 39.00 | 125.75 | 0.67 |
| Songnim | PRK | 38.73 | 125.62 | 0.80 |
| Bazias | ROM | 44.80 | 21.40 | 0.67 |
| Braila | ROM | 45.25 | 27.98 | 0.64 |
| Bucharest | ROM | 44.42 | 26.12 | 0.64 |
| Calarasi | ROM | 44.18 | 27.32 | 0.71 |
| Galatz | ROM | 45.42 | 28.08 | 0.64 |
| Giurgiu | ROM | 43.90 | 25.97 | 0.71 |
| Oltenitza | ROM | 44.03 | 26.58 | 0.70 |
| Orsova | ROM | 44.70 | 22.37 | 0.55 |
| Tulcea | ROM | 45.17 | 28.82 | 0.60 |
| Turnu Severin | ROM | 44.63 | 22.67 | 0.67 |
| Akhtubinsk | RUS | 48.33 | 46.17 | 0.59 |
| Annenskiy Most | RUS | 60.72 | 37.08 | 0.84 |
| Astrakhan | RUS | 46.37 | 48.07 | 0.67 |
| Azov | RUS | 47.10 | 39.43 | 0.87 |
| Bagaevskaya | RUS | 47.32 | 40.38 | 0.56 |
| Balakhna | RUS | 56.48 | 43.62 | 0.44 |
| Balakovo | RUS | 52.07 | 47.77 | 0.16 |
| Baltiysk | RUS | 54.65 | 19.90 | 1.01 |
| Belyy Ruchey | RUS | 60.90 | 36.83 | 0.86 |
| Berezniki | RUS | 59.43 | 56.82 | 0.72 |
| Brusnichnoye | RUS | 60.78 | 28.73 | 0.77 |
| Cheboksary | RUS | 56.13 | 47.23 | 0.43 |
| Cherepovets | RUS | 59.15 | 37.83 | 0.68 |
| Chkalovsk | RUS | 56.75 | 43.23 | 0.46 |
| Gorokhovets | RUS | 56.18 | 42.70 | 0.44 |
| Kalach-na-Donu | RUS | 48.72 | 43.48 | 0.35 |
| Kaliningrad | RUS | 54.72 | 20.52 | 0.82 |
| Kamyshin | RUS | 50.08 | 45.40 | 0.30 |
| Kanonerskiy Is. | RUS | 59.90 | 30.22 | 0.65 |
| Kazan | RUS | 55.75 | 49.17 | 0.33 |
| Khabarovsk | RUS | 48.50 | 135.17 | 0.48 |
| Kineshma | RUS | 57.45 | 42.12 | 0.55 |
| Kirovsk | RUS | 59.87 | 30.98 | 0.71 |
| Komsomolsk-na-Amure | RUS | 50.53 | 136.98 | 0.79 |
| Kondopoga | RUS | 62.20 | 34.28 | 0.88 |
| Konstantinovsk | RUS | 47.55 | 41.10 | 0.48 |
| Kostroma | RUS | 57.77 | 40.93 | 0.51 |
| Kotlas | RUS | 61.25 | 46.65 | 0.80 |

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|---|---|---|---|---|
| Krasnoyarsk | RUS | 56.08 | 92.77 | 0.68 |
| Krasnyye Barrikady | RUS | 46.20 | 47.85 | 0.69 |
| Kronshtadt | RUS | 60.00 | 29.77 | 0.71 |
| Lomonosov | RUS | 59.83 | 29.80 | 0.75 |
| Mago | RUS | 53.25 | 140.22 | 0.97 |
| Medvezhyegorsk | RUS | 62.93 | 34.47 | 0.98 |
| Mondoma | RUS | 59.93 | 37.47 | 0.80 |
| Naberezhnyye Chelny | RUS | 55.68 | 52.30 | 0.38 |
| Nadvoitsy | RUS | 63.93 | 34.33 | 1.07 |
| Navashino | RUS | 55.55 | 42.18 | 0.39 |
| Nikolayevsk | RUS | 53.13 | 140.72 | 1.00 |
| Nikolayevskaya | RUS | 47.60 | 41.48 | 0.50 |
| Nizhnekamsk | RUS | 55.42 | 51.88 | 0.38 |
| Nizhnetambovskoye | RUS | 50.93 | 138.17 | 0.86 |
| Nizhniy Novgorod | RUS | 56.33 | 44.00 | 0.45 |
| Nizhnyaya Gavan | RUS | 52.40 | 140.43 | 0.97 |
| Novgorod | RUS | 58.50 | 31.33 | 0.62 |
| Novocheboksarsk | RUS | 56.10 | 47.48 | 0.40 |
| Olya | RUS | 45.78 | 47.53 | 0.74 |
| Otradnoye | RUS | 59.77 | 30.80 | 0.69 |
| Perm | RUS | 58.02 | 56.17 | 0.60 |
| Petrodvorets | RUS | 59.88 | 29.92 | 0.68 |
| Petrozavodsk | RUS | 61.77 | 34.32 | 0.90 |
| Pionerskiy | RUS | 54.93 | 20.20 | 0.84 |
| Podporozhye | RUS | 60.92 | 34.03 | 0.78 |
| Primorsk | RUS | 60.37 | 28.63 | 0.78 |
| Priozersk | RUS | 61.02 | 30.13 | 0.76 |
| Pudozh | RUS | 61.83 | 36.53 | 0.84 |
| Rostov | RUS | 47.17 | 39.70 | 0.88 |
| Rybinsk | RUS | 58.02 | 38.87 | 0.60 |
| Samara | RUS | 53.17 | 50.17 | 0.16 |
| Saratov | RUS | 51.50 | 45.92 | 0.20 |
| Segezha | RUS | 63.70 | 34.32 | 1.07 |
| Semikarakorsk | RUS | 47.55 | 41.10 | 0.48 |
| Shlisselburg | RUS | 59.93 | 31.13 | 0.71 |
| Solikamsk | RUS | 59.67 | 56.75 | 0.75 |
| Sosnovka | RUS | 56.23 | 51.28 | 0.41 |
| St. Petersburg | RUS | 59.93 | 30.30 | 0.65 |
| Svetlyy | RUS | 54.63 | 20.15 | 0.82 |
| Syzran | RUS | 53.17 | 48.48 | 0.13 |
| Taganrog | RUS | 47.20 | 38.95 | 0.86 |
| Tatyanka | RUS | 45.93 | 48.28 | 0.74 |
| Tolyatti | RUS | 53.53 | 49.40 | 0.20 |
| Tomsk | RUS | 56.50 | 85.08 | 0.64 |
| Ust Donets | RUS | 47.67 | 40.95 | 0.49 |
| Ust-Luga | RUS | 59.67 | 28.30 | 0.81 |
| Volgodonsk | RUS | 47.50 | 42.12 | 0.48 |
| Volgograd | RUS | 48.75 | 44.50 | 0.42 |
| Volzhskiy | RUS | 48.82 | 44.73 | 0.51 |
| Voznesenye | RUS | 61.02 | 35.47 | 0.79 |

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|---|---|---|---|---|
| Vyborg | RUS | 60.72 | 28.73 | 0.77 |
| Vysotsk | RUS | 60.63 | 28.57 | 0.76 |
| Vytegra | RUS | 61.07 | 36.45 | 0.80 |
| Yaroslavl | RUS | 57.57 | 39.87 | 0.52 |
| Yeisk | RUS | 46.73 | 38.27 | 0.95 |
| Zelenodolsk | RUS | 55.83 | 48.50 | 0.36 |
| Apatin | SCG | 45.67 | 19.00 | 0.64 |
| Belgrade | SCG | 44.80 | 20.47 | 0.78 |
| Bezdam | SCG | 45.83 | 18.93 | 0.63 |
| Kladovo | SCG | 44.60 | 22.55 | 0.67 |
| Mitrovica | SCG | 42.90 | 20.87 | 0.57 |
| Novi Becej | SCG | 45.58 | 20.13 | 0.67 |
| Novi Sad | SCG | 45.27 | 19.83 | 0.67 |
| Pancevo | SCG | 44.87 | 20.67 | 0.79 |
| Zrenjanin | SCG | 45.37 | 10.38 | 0.87 |
| Bratislava | SVK | 48.15 | 17.12 | 0.52 |
| Komarno | SVK | 47.77 | 18.08 | 0.56 |
| Aelvenaes | SWE | 59.37 | 13.18 | 0.84 |
| Amal | SWE | 59.05 | 12.72 | 0.83 |
| Arvika | SWE | 59.67 | 12.58 | 0.86 |
| Balsta | SWE | 59.55 | 17.55 | 0.85 |
| Edsvalla | SWE | 59.43 | 13.23 | 0.84 |
| Elleholm | SWE | 56.17 | 14.73 | 0.98 |
| Enkoping | SWE | 59.63 | 17.08 | 0.93 |
| Fiskeback | SWE | 57.87 | 14.10 | 0.92 |
| Fittja | SWE | 59.23 | 17.85 | 0.78 |
| Furillen | SWE | 57.77 | 19.00 | 1.10 |
| Gamleby | SWE | 57.90 | 16.42 | 0.95 |
| Gefle | SWE | 60.67 | 17.17 | 1.05 |
| Gruvon | SWE | 59.33 | 13.12 | 0.83 |
| Hallekis | SWE | 58.67 | 13.42 | 0.83 |
| Hasselby | SWE | 59.37 | 17.82 | 0.80 |
| Hernosand | SWE | 62.63 | 17.93 | 1.06 |
| Hoglunda | SWE | 59.42 | 13.25 | 0.84 |
| Honsater | SWE | 58.63 | 13.45 | 0.83 |
| Hornefors | SWE | 63.62 | 19.90 | 1.07 |
| Kallviken | SWE | 64.33 | 21.37 | 1.10 |
| Kalmarsand | SWE | 59.53 | 17.52 | 0.85 |
| Karlshamn | SWE | 56.17 | 14.87 | 1.02 |
| Karlskrona | SWE | 56.17 | 15.60 | 1.01 |
| Karlstad | SWE | 59.38 | 13.52 | 0.84 |
| Klintehamn | SWE | 57.38 | 18.20 | 0.98 |
| Koping | SWE | 59.52 | 16.00 | 0.95 |
| Kopmannebro | SWE | 58.77 | 12.52 | 0.80 |
| Kristinehamn | SWE | 59.32 | 14.12 | 0.83 |
| Krokstad | SWE | 59.10 | 12.92 | 0.82 |
| Kungsor | SWE | 59.43 | 16.10 | 0.92 |
| Kyrkebyn | SWE | 59.27 | 13.07 | 0.83 |
| Lidkoping | SWE | 58.50 | 13.17 | 0.82 |
| Liljeholmsviken | SWE | 59.32 | 18.00 | 0.78 |

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|---|---|---|---|---|
| Ljustero | SWE | 59.52 | 18.63 | 0.87 |
| Loudden | SWE | 59.33 | 18.13 | 0.77 |
| Mariestad | SWE | 58.72 | 13.83 | 0.82 |
| Marsviken | SWE | 58.67 | 16.95 | 0.85 |
| Mem | SWE | 58.48 | 16.42 | 0.85 |
| Monsteras | SWE | 57.03 | 16.47 | 0.98 |
| Motala | SWE | 58.53 | 15.07 | 0.83 |
| Norrkoping | SWE | 58.60 | 16.20 | 0.84 |
| Norrsundet | SWE | 60.95 | 17.17 | 1.03 |
| Norrtalje | SWE | 59.75 | 18.70 | 0.90 |
| Norsbron | SWE | 59.42 | 13.23 | 0.84 |
| Nykoping | SWE | 58.75 | 17.02 | 0.85 |
| Orebro | SWE | 59.28 | 15.18 | 0.85 |
| Ornskoldsvik | SWE | 63.27 | 18.72 | 1.07 |
| Oskarshamn | SWE | 57.27 | 16.45 | 0.98 |
| Otterbacken | SWE | 58.95 | 14.05 | 0.85 |
| Ronneby | SWE | 56.17 | 15.30 | 1.01 |
| Rundvik | SWE | 63.53 | 19.45 | 1.10 |
| Saffle | SWE | 59.13 | 12.93 | 0.82 |
| Sankt Anna | SWE | 58.33 | 16.70 | 0.84 |
| Sjotorp | SWE | 58.83 | 14.00 | 0.83 |
| Skattkar | SWE | 59.42 | 13.70 | 0.84 |
| Skoghall | SWE | 59.32 | 13.45 | 0.80 |
| Skutskar | SWE | 60.65 | 17.40 | 0.97 |
| Slottsbron | SWE | 59.33 | 13.10 | 0.83 |
| Soderkoping | SWE | 58.48 | 16.33 | 0.86 |
| Solvesborg | SWE | 56.05 | 14.58 | 1.00 |
| Soraker | SWE | 62.50 | 17.50 | 1.06 |
| Spesshult | SWE | 59.07 | 12.92 | 0.82 |
| Stockholm | SWE | 59.32 | 18.05 | 0.77 |
| Stocksund | SWE | 59.38 | 18.05 | 0.78 |
| Strangnas | SWE | 59.38 | 17.03 | 0.91 |
| Studsvik | SWE | 58.75 | 17.28 | 0.84 |
| Sturko | SWE | 56.08 | 15.67 | 1.01 |
| Taxinge | SWE | 59.22 | 17.37 | 0.85 |
| Torko | SWE | 56.15 | 15.40 | 1.01 |
| Trelleborg | SWE | 55.37 | 13.15 | 0.94 |
| Uppsala | SWE | 59.87 | 17.65 | 0.78 |
| Valdemarsvik | SWE | 58.20 | 16.60 | 0.85 |
| Vaxholm | SWE | 59.38 | 18.33 | 0.80 |
| Vesteras | SWE | 59.60 | 16.43 | 0.94 |
| Visby | SWE | 57.65 | 18.28 | 0.98 |
| Ystad | SWE | 55.43 | 13.83 | 0.95 |
| Berdiansk | UKR | 46.75 | 36.78 | 0.91 |
| Cherkassy | UKR | 49.43 | 32.05 | 0.26 |
| Dneprodzerzhinsk | UKR | 48.50 | 34.62 | 0.29 |
| Dnepropetrovsk | UKR | 48.48 | 35.00 | 0.32 |
| Kiev | UKR | 50.42 | 30.50 | 0.31 |
| Kremenchug | UKR | 49.05 | 33.42 | 0.25 |
| Mariupol | UKR | 47.05 | 37.50 | 0.84 |

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|---|---|---|---|---|
| Reni | UKR | 45.43 | 28.30 | 0.63 |
| Tyaginka | UKR | 46.75 | 33.05 | 0.43 |
| Zaporozhye | UKR | 47.83 | 35.17 | 0.44 |
| Albany | USA | 42.65 | -73.75 | 0.31 |
| Allyns Point | USA | 41.43 | -72.07 | 0.63 |
| Alpena | USA | 45.05 | -83.43 | 0.46 |
| Alsen | USA | 42.18 | -73.92 | 0.28 |
| Ashland | USA | 46.58 | -90.90 | 0.54 |
| Ashtabula | USA | 41.92 | -80.82 | 0.34 |
| Bangor | USA | 44.80 | -68.78 | 0.15 |
| Bath | USA | 43.90 | -69.82 | 0.45 |
| Bay City | USA | 43.58 | -83.88 | 0.21 |
| Bayfield | USA | 46.80 | -90.80 | 0.65 |
| Belfast | USA | 44.42 | -69.00 | 0.75 |
| Benton Harbour | USA | 42.12 | -86.45 | 0.33 |
| Beverly | USA | 46.82 | -119.92 | 0.63 |
| Brevort | USA | 46.00 | -85.03 | 0.52 |
| Buchanan | USA | 41.20 | -73.92 | 0.63 |
| Bucksport | USA | 44.57 | -68.80 | 0.46 |
| Buffalo | USA | 42.88 | -78.88 | 0.29 |
| Buffington | USA | 41.63 | -87.42 | 0.26 |
| Burlington (NJ) | USA | 40.08 | -74.85 | 0.87 |
| Burns Harbour | USA | 41.63 | -87.18 | 0.28 |
| Calcite | USA | 45.40 | -83.78 | 0.57 |
| Camden (NJ) | USA | 39.93 | -75.13 | 0.89 |
| Castine | USA | 44.38 | -68.83 | 1.10 |
| Catskill | USA | 42.22 | -73.88 | 0.28 |
| Cedarville | USA | 45.98 | -84.35 | 0.69 |
| Cementon | USA | 42.13 | -73.92 | 0.32 |
| Charlevoix | USA | 45.32 | -85.22 | 0.37 |
| Cheboygan | USA | 45.67 | -84.47 | 0.53 |
| Chester (PA) | USA | 39.83 | -75.37 | 0.91 |
| Chicago | USA | 41.83 | -87.63 | 0.26 |
| Claymont | USA | 39.80 | -75.43 | 0.91 |
| Clayton | USA | 44.23 | -76.08 | 0.19 |
| Cleveland | USA | 41.52 | -81.72 | 0.39 |
| Conneaut | USA | 41.97 | -80.57 | 0.33 |
| Coxsackie | USA | 42.33 | -73.80 | 0.29 |
| Delair | USA | 40.00 | -75.03 | 0.89 |
| Delaware City | USA | 39.57 | -75.58 | 0.92 |
| Detour | USA | 45.97 | -83.88 | 0.70 |
| Detroit | USA | 42.33 | -83.03 | 0.24 |
| Duluth | USA | 46.73 | -92.15 | 0.72 |
| East St. Louis | USA | 38.62 | -90.18 | 1.08 |
| Eddystone | USA | 39.83 | -75.33 | 0.91 |
| Erie | USA | 42.17 | -80.08 | 0.32 |
| Escanaba | USA | 45.78 | -87.07 | 0.39 |
| Essexville | USA | 43.60 | -83.83 | 0.21 |
| Fairless Hills | USA | 40.17 | -74.88 | 0.87 |
| Fairport | USA | 41.77 | -81.32 | 0.37 |

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|---|---|---|---|---|
| Ferrysburg | USA | 43.08 | -86.23 | 0.40 |
| Gary Harbour | USA | 41.60 | -87.35 | 0.26 |
| Gloucester (NJ) | USA | 39.88 | -75.13 | 0.89 |
| Grand Haven | USA | 43.07 | -86.25 | 0.39 |
| Grand River | USA | 41.73 | -81.28 | 0.36 |
| Green Bay | USA | 44.52 | -88.00 | 0.14 |
| Groton | USA | 41.35 | -72.08 | 0.96 |
| Harbor Beach | USA | 43.83 | -82.65 | 0.41 |
| Holland (MI) | USA | 42.78 | -86.22 | 0.40 |
| Huron | USA | 41.40 | -82.58 | 0.41 |
| Hyde Park | USA | 41.78 | -73.93 | 0.33 |
| Indiana Harbour | USA | 41.67 | -87.50 | 0.26 |
| Jeffersonville | USA | 38.27 | -85.75 | 1.05 |
| Kalama | USA | 46.02 | -122.83 | 0.96 |
| Kenosha | USA | 42.58 | -87.82 | 0.28 |
| Kewaunee | USA | 44.45 | -87.52 | 0.58 |
| Kingston | USA | 41.87 | -73.97 | 0.33 |
| Lafayette | USA | 40.40 | -86.88 | 0.60 |
| Lorain | USA | 41.47 | -82.17 | 0.41 |
| Louisville | USA | 38.23 | -85.77 | 1.05 |
| Ludington | USA | 43.97 | -86.45 | 0.63 |
| Mackinaw City | USA | 45.75 | -84.73 | 0.52 |
| Manistee | USA | 44.25 | -86.33 | 0.65 |
| Manitowoc | USA | 44.10 | -87.63 | 0.55 |
| Marblehead | USA | 41.53 | -82.72 | 0.47 |
| Marcus Hook | USA | 39.82 | -75.42 | 0.91 |
| Marine City | USA | 42.72 | -82.48 | 0.27 |
| Marinette | USA | 45.12 | -87.62 | 0.31 |
| Marquette | USA | 46.60 | -87.38 | 0.79 |
| Marysville | USA | 42.92 | -82.48 | 0.26 |
| Menominee | USA | 45.13 | -87.62 | 0.33 |
| Milton | USA | 41.60 | -73.95 | 0.45 |
| Milwaukee | USA | 43.05 | -87.87 | 0.37 |
| Monroe | USA | 41.92 | -83.33 | 0.43 |
| Mossville | USA | 40.80 | -89.57 | 0.62 |
| Mount Vernon | USA | 37.92 | -87.88 | 1.05 |
| Muskegon | USA | 43.18 | -86.23 | 0.43 |
| New London | USA | 41.40 | -72.10 | 0.75 |
| Newburgh | USA | 41.50 | -74.08 | 0.46 |
| Ogdensburg | USA | 44.70 | -75.50 | 0.06 |
| Olympia | USA | 47.05 | -122.90 | 1.00 |
| Ontonagon | USA | 46.87 | -89.30 | 0.69 |
| Oswego | USA | 43.47 | -76.53 | 0.29 |
| Pasco | USA | 46.22 | -119.08 | 0.88 |
| Paulsboro | USA | 39.83 | -75.25 | 0.90 |
| Peekskill | USA | 41.25 | -73.92 | 0.63 |
| Pennsauken | USA | 39.97 | -75.03 | 0.89 |
| Peoria | USA | 40.68 | -89.58 | 0.62 |
| Philadelphia | USA | 39.90 | -75.13 | 0.89 |
| Pittsburgh (PA) | USA | 40.43 | -80.00 | 0.54 |

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|---|---|---|---|---|
| Point Pleasant | USA | 38.88 | -82.12 | 0.77 |
| Port Dolomite | USA | 45.97 | -84.27 | 0.62 |
| Port Huron | USA | 42.98 | -82.43 | 0.25 |
| Port Inland | USA | 45.97 | -85.87 | 0.55 |
| Port Jefferson | USA | 40.95 | -73.07 | 1.06 |
| Port Washington | USA | 43.38 | -87.87 | 0.46 |
| Portland (OR) | USA | 45.57 | -122.73 | 0.92 |
| Poughkeepsie | USA | 41.68 | -73.88 | 0.33 |
| Providence | USA | 41.80 | -71.38 | 0.88 |
| Racine | USA | 42.73 | -87.80 | 0.27 |
| Ravena | USA | 42.47 | -73.80 | 0.29 |
| Reedy Point | USA | 39.57 | -75.57 | 0.92 |
| Rensselaer | USA | 42.65 | -73.73 | 0.31 |
| Rochester (NY) | USA | 43.28 | -77.60 | 0.24 |
| Rockport (MI) | USA | 45.20 | -83.38 | 0.57 |
| Rogers City | USA | 45.40 | -83.83 | 0.58 |
| Roseton | USA | 41.57 | -74.00 | 0.36 |
| Saginaw | USA | 43.45 | -83.92 | 0.22 |
| Salem (NJ) | USA | 39.57 | -75.47 | 0.92 |
| Sandusky | USA | 41.45 | -82.73 | 0.45 |
| Searsport | USA | 44.45 | -68.92 | 0.99 |
| Sheboygan | USA | 43.75 | -87.70 | 0.60 |
| Shippensburg | USA | 40.03 | -77.52 | 0.59 |
| Somerset (MA) | USA | 41.78 | -71.13 | 0.81 |
| South Brewer | USA | 44.78 | -68.78 | 0.15 |
| South Haven | USA | 42.45 | -86.25 | 0.37 |
| St. Clair | USA | 42.82 | -82.47 | 0.26 |
| St. Joseph | USA | 42.08 | -86.50 | 0.33 |
| St. Louis (MO) | USA | 38.67 | -90.25 | 1.08 |
| Stoneport | USA | 45.28 | -83.43 | 0.58 |
| Stony Point | USA | 41.23 | -73.97 | 0.63 |
| Superior | USA | 46.72 | -92.08 | 0.72 |
| Tell City | USA | 37.95 | -86.77 | 1.03 |
| The Dalles | USA | 45.58 | -121.18 | 0.61 |
| Toledo(USA) | USA | 41.70 | -83.47 | 0.45 |
| Tomkins Cove | USA | 41.27 | -73.98 | 0.63 |
| Tonawanda | USA | 43.02 | -78.88 | 0.29 |
| Trenton | USA | 40.18 | -74.75 | 0.83 |
| Troutdale | USA | 45.53 | -122.38 | 0.93 |
| Troy | USA | 42.73 | -73.68 | 0.29 |
| Tullytown | USA | 40.13 | -74.82 | 0.83 |
| Two Harbors | USA | 47.02 | -91.67 | 1.06 |
| Umatilla | USA | 45.92 | -119.33 | 0.79 |
| Vancouver | USA | 45.63 | -122.67 | 0.92 |
| Waddington | USA | 44.85 | -75.20 | 0.11 |
| Warren | USA | 41.73 | -71.30 | 1.03 |
| Waukegan | USA | 42.37 | -87.83 | 0.22 |
| Westville | USA | 39.87 | -75.13 | 0.89 |
| Whitefish Point | USA | 46.75 | -84.95 | 0.81 |
| Willbridge | USA | 45.57 | -122.75 | 0.92 |

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|---|---|---|---|---|
| Wilmington (DE) | USA | 39.75 | -75.50 | 0.86 |
| Winterport | USA | 44.63 | -68.85 | 0.40 |
| Wiscasset | USA | 44.00 | -69.67 | 0.46 |
| Wyandotte | USA | 42.18 | -83.15 | 0.35 |
| Yonkers | USA | 40.95 | -73.83 | 0.79 |
| Zilwaukee | USA | 43.47 | -83.92 | 0.22 |

Appendix D. List of global ports that have highest environmental similarity to Toronto. NIS originating from these ports have the highest potential for survival if introduced at Toronto.

| Name | Country | Latitude | Longitude | Environmental Distance |
|---|---|---|---|---|
| Eckero | ALD | 60.22 | 19.60 | 0.69 |
| Farjsundet | ALD | 60.23 | 20.02 | 0.96 |
| Finstrom | ALD | 60.25 | 19.92 | 0.96 |
| Langnasudd | ALD | 60.12 | 20.30 | 0.98 |
| Mariehamn | ALD | 60.10 | 19.93 | 1.03 |
| Launceston | AUS | -41.44 | 147.14 | 1.09 |
| Korneuburg | AUT | 48.37 | 16.33 | 0.42 |
| Linz | AUT | 48.32 | 14.30 | 0.26 |
| Vienna | AUT | 48.22 | 16.37 | 0.51 |
| Antwerp | BEL | 51.24 | 4.41 | 0.60 |
| Baasrode | BEL | 51.05 | 4.17 | 0.62 |
| Balen | BEL | 51.17 | 5.17 | 0.57 |
| Boom | BEL | 51.08 | 4.37 | 0.59 |
| Brussels | BEL | 50.83 | 4.32 | 0.59 |
| Buggenhout | BEL | 51.02 | 4.20 | 0.61 |
| Burcht | BEL | 51.20 | 4.33 | 0.62 |
| Chatelineau | BEL | 50.42 | 4.52 | 0.52 |
| Dendermonde | BEL | 51.03 | 4.12 | 0.62 |
| Doel | BEL | 51.32 | 4.27 | 0.64 |
| Engis | BEL | 50.58 | 5.40 | 0.51 |
| Ertvelde | BEL | 51.20 | 3.78 | 0.66 |
| Geel | BEL | 51.15 | 4.97 | 0.57 |
| Genk | BEL | 50.94 | 5.50 | 0.55 |
| Ghent | BEL | 51.09 | 3.75 | 0.64 |
| Grimbergen | BEL | 50.93 | 4.37 | 0.58 |
| Grobbendonk | BEL | 51.20 | 4.75 | 0.58 |
| Haren | BEL | 50.90 | 4.38 | 0.58 |
| Hemiksem | BEL | 51.15 | 4.34 | 0.59 |
| Hermalle sous Huy | BEL | 50.55 | 5.37 | 0.51 |
| Hingene | BEL | 51.12 | 4.27 | 0.61 |
| Hoboken | BEL | 51.17 | 4.33 | 0.61 |
| Humbeek | BEL | 50.97 | 4.38 | 0.58 |
| Kallo | BEL | 51.25 | 4.28 | 0.62 |
| Kapelle op den Bos | BEL | 51.02 | 4.37 | 0.59 |
| Kruibeke | BEL | 51.17 | 4.32 | 0.61 |

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|---|---|---|---|---|
| Kwaadmechelen | BEL | 51.10 | 5.15 | 0.57 |
| Lanaken | BEL | 50.88 | 5.65 | 0.55 |
| Langerbrugge | BEL | 51.12 | 3.75 | 0.64 |
| Liefkenshoek | BEL | 51.30 | 4.28 | 0.64 |
| Liege | BEL | 50.64 | 5.57 | 0.51 |
| Lillo | BEL | 51.30 | 4.30 | 0.64 |
| Lixhe | BEL | 50.73 | 5.70 | 0.53 |
| Maasmechelen | BEL | 50.97 | 5.70 | 0.55 |
| Marly | BEL | 50.88 | 4.38 | 0.58 |
| Mechelen | BEL | 51.03 | 4.47 | 0.59 |
| Melle | BEL | 51.00 | 3.80 | 0.61 |
| Merksem | BEL | 51.23 | 4.48 | 0.60 |
| Nameche | BEL | 50.47 | 4.98 | 0.52 |
| Niel | BEL | 51.12 | 4.33 | 0.61 |
| Olen | BEL | 51.15 | 4.87 | 0.57 |
| Puurs | BEL | 51.07 | 4.27 | 0.61 |
| Rieme | BEL | 51.17 | 3.77 | 0.65 |
| Ruisbroek | BEL | 50.78 | 4.28 | 0.59 |
| Rumst | BEL | 51.07 | 4.42 | 0.59 |
| Rupelmonde | BEL | 51.13 | 4.28 | 0.61 |
| Schelle | BEL | 51.13 | 4.32 | 0.61 |
| Schoten | BEL | 51.25 | 4.50 | 0.60 |
| Seilles | BEL | 50.50 | 5.08 | 0.50 |
| Sint-Kruis-Winkel | BEL | 51.15 | 3.80 | 0.65 |
| Temse | BEL | 51.13 | 4.22 | 0.61 |
| Terdonk | BEL | 51.15 | 3.78 | 0.65 |
| Terhagen | BEL | 51.08 | 4.38 | 0.59 |
| Tessenderlo | BEL | 51.07 | 5.08 | 0.57 |
| Tielrode | BEL | 51.12 | 4.22 | 0.61 |
| Tisselt | BEL | 51.03 | 4.37 | 0.59 |
| Val St. Lambert | BEL | 50.57 | 5.47 | 0.51 |
| Verbrande Brug | BEL | 50.95 | 4.38 | 0.58 |
| Vilvoorde | BEL | 50.95 | 4.42 | 0.58 |
| Willebroek | BEL | 51.05 | 4.35 | 0.59 |
| Wintham | BEL | 51.10 | 4.28 | 0.61 |
| Wondelgem | BEL | 51.08 | 3.72 | 0.64 |
| Zelzate | BEL | 51.20 | 3.80 | 0.66 |
| Zutendaal | BEL | 50.92 | 5.57 | 0.55 |
| Zwyndrecht | BEL | 51.22 | 4.33 | 0.62 |
| Kozloduy | BGR | 43.78 | 23.72 | 0.89 |
| Lom | BGR | 43.83 | 23.20 | 0.80 |
| Rousse | BGR | 43.83 | 25.97 | 0.80 |
| Silistra | BGR | 44.10 | 27.25 | 0.79 |
| Amherstburg | CAN | 42.10 | -83.08 | 0.65 |
| Baddeck | CAN | 46.10 | -60.73 | 0.78 |

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|---|---|---|---|---|
| Bath | CAN | 44.17 | -76.77 | 0.31 |
| Batiscan | CAN | 46.52 | -72.23 | 0.34 |
| Bayside | CAN | 45.17 | -67.13 | 0.80 |
| Becancour | CAN | 46.40 | -72.38 | 0.31 |
| Bella Coola | CAN | 52.38 | -126.77 | 0.99 |
| Belleville | CAN | 44.13 | -77.37 | 0.23 |
| Bowmanville | CAN | 43.90 | -78.67 | 0.05 |
| Boylston | CAN | 45.45 | -61.52 | 0.93 |
| Britt | CAN | 45.77 | -80.58 | 0.20 |
| Brockville | CAN | 44.60 | -75.63 | 0.35 |
| Bronte | CAN | 43.40 | -79.70 | 0.08 |
| Bruce Mines | CAN | 46.27 | -83.72 | 0.39 |
| Burlington | CAN | 43.32 | -79.75 | 0.16 |
| Cardinal | CAN | 44.78 | -75.33 | 0.38 |
| Chicoutimi | CAN | 48.43 | -71.08 | 0.45 |
| Clarkson | CAN | 43.50 | -79.60 | 0.10 |
| Cobourg | CAN | 43.95 | -78.17 | 0.17 |
| Colborne | CAN | 44.00 | -77.88 | 0.18 |
| Collingwood | CAN | 44.50 | -80.23 | 0.10 |
| Contrecoeur | CAN | 45.88 | -73.20 | 0.32 |
| Cornwall | CAN | 45.02 | -74.72 | 0.37 |
| Corunna | CAN | 42.88 | -82.45 | 0.25 |
| Cote Ste-Catherine | CAN | 45.41 | -73.58 | 0.37 |
| Country Harbour | CAN | 45.22 | -61.73 | 0.96 |
| Courtright | CAN | 42.80 | -82.45 | 0.25 |
| Erieau | CAN | 42.25 | -81.93 | 0.55 |
| Fort Erie | CAN | 42.93 | -78.95 | 0.53 |
| Fredericton | CAN | 45.95 | -66.65 | 0.23 |
| Gananoque | CAN | 44.32 | -76.15 | 0.39 |
| Goderich | CAN | 43.75 | -81.75 | 0.14 |
| Gold River | CAN | 49.68 | -126.12 | 0.78 |
| Goose Bay | CAN | 53.35 | -60.42 | 0.96 |
| Grondines | CAN | 46.75 | -72.03 | 0.39 |
| Hamilton | CAN | 43.23 | -79.85 | 0.10 |
| Hay River | CAN | 60.85 | -115.70 | 1.03 |
| Houston | CAN | 54.40 | -126.65 | 0.98 |
| Humberstone | CAN | 42.90 | -79.25 | 0.49 |
| Iona | CAN | 45.97 | -60.80 | 0.37 |
| Isaac's Harbour | CAN | 45.17 | -61.65 | 1.05 |
| Killarney | CAN | 45.97 | -81.52 | 0.30 |
| Kingston | CAN | 44.20 | -76.50 | 0.37 |
| Kingsville | CAN | 42.02 | -82.72 | 0.68 |
| Kitimat | CAN | 54.00 | -128.70 | 0.61 |
| Lanoraie | CAN | 45.97 | -73.18 | 0.32 |
| Lauzon | CAN | 46.82 | -71.15 | 0.34 |

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|---|---|---|---|---|
| Leamington | CAN | 42.05 | -82.62 | 0.69 |
| Levis | CAN | 46.82 | -71.18 | 0.31 |
| Little Current | CAN | 45.97 | -81.92 | 0.12 |
| Little Narrows | CAN | 45.98 | -60.98 | 0.31 |
| Long Sault | CAN | 45.02 | -74.90 | 0.33 |
| Marathon | CAN | 48.75 | -86.38 | 0.93 |
| Meldrum Bay | CAN | 45.92 | -83.10 | 0.36 |
| Michipicoten Harbour | CAN | 47.95 | -84.92 | 0.63 |
| Midland | CAN | 44.75 | -79.93 | 0.11 |
| Montréal | CAN | 45.50 | -73.55 | 0.40 |
| Mooretown | CAN | 42.85 | -82.47 | 0.25 |
| Morrisburg | CAN | 44.93 | -75.18 | 0.31 |
| Nanticoke | CAN | 42.82 | -80.07 | 0.42 |
| Nelson | CAN | 49.47 | -117.30 | 0.83 |
| Oakville | CAN | 43.43 | -79.67 | 0.07 |
| Ocean Falls | CAN | 52.35 | -127.70 | 0.87 |
| Oshawa | CAN | 43.87 | -78.83 | 0.05 |
| Ottawa | CAN | 45.40 | -75.70 | 0.34 |
| Owen Sound | CAN | 44.58 | -80.95 | 0.08 |
| Parry Sound | CAN | 45.37 | -80.05 | 0.12 |
| Pelee Island | CAN | 41.75 | -82.67 | 0.73 |
| Picton | CAN | 44.00 | -77.13 | 0.30 |
| Pointe aux Trembles | CAN | 45.63 | -73.48 | 0.35 |
| Port Alberni | CAN | 49.23 | -125.00 | 0.71 |
| Port Alice | CAN | 50.38 | -127.45 | 1.01 |
| Port Burwell | CAN | 42.63 | -80.80 | 0.41 |
| Port Colborne | CAN | 42.87 | -79.25 | 0.50 |
| Port Credit | CAN | 43.55 | -79.60 | 0.03 |
| Port Dalhousie | CAN | 43.20 | -79.27 | 0.22 |
| Port Dover | CAN | 42.78 | -80.20 | 0.38 |
| Port Hope | CAN | 43.95 | -78.28 | 0.15 |
| Port Maitland | CAN | 42.87 | -79.58 | 0.46 |
| Port McNicoll | CAN | 44.75 | -79.80 | 0.12 |
| Port Stanley | CAN | 42.67 | -81.22 | 0.42 |
| Port Weller | CAN | 43.23 | -79.22 | 0.26 |
| Prescott | CAN | 44.72 | -75.52 | 0.34 |
| Québec | CAN | 46.82 | -71.20 | 0.31 |
| Sarnia | CAN | 42.98 | -82.42 | 0.24 |
| Sault Ste. Marie | CAN | 46.52 | -84.33 | 0.33 |
| Sombra | CAN | 42.70 | -82.47 | 0.25 |
| Sonora | CAN | 45.07 | -61.92 | 0.98 |
| Sorel | CAN | 46.05 | -73.12 | 0.35 |
| Spragge | CAN | 46.22 | -82.67 | 0.19 |
| St. Catharines | CAN | 43.17 | -79.27 | 0.20 |
| St. Romuald | CAN | 46.75 | -71.23 | 0.31 |

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|---|---|---|---|---|
| St. Stephen | CAN | 45.20 | -67.28 | 0.45 |
| Ste. Croix | CAN | 46.63 | -71.73 | 0.32 |
| Tahsis | CAN | 49.92 | -126.67 | 1.02 |
| Thessalon | CAN | 46.25 | -83.55 | 0.38 |
| Thorold | CAN | 43.08 | -79.17 | 0.46 |
| Three Rivers | CAN | 46.35 | -72.55 | 0.31 |
| Thunder Bay | CAN | 48.42 | -89.22 | 0.79 |
| Tobermory | CAN | 45.23 | -81.65 | 0.34 |
| Toronto | CAN | 43.63 | -79.38 | 0.00 |
| Tracy | CAN | 46.02 | -73.17 | 0.33 |
| Valleyfield | CAN | 45.22 | -74.08 | 0.36 |
| Wallaceburg | CAN | 42.60 | -82.40 | 0.25 |
| Welland | CAN | 42.97 | -79.22 | 0.42 |
| Weymouth | CAN | 44.45 | -66.02 | 0.78 |
| Wheatley | CAN | 42.08 | -82.43 | 0.57 |
| Whitby | CAN | 43.85 | -78.92 | 0.02 |
| Windsor | CAN | 42.32 | -83.05 | 0.41 |
| Basle | CHE | 47.55 | 7.57 | 0.42 |
| Dandong | CHN | 40.13 | 124.40 | 1.04 |
| Fujin | CHN | 47.25 | 132.02 | 0.68 |
| Harbin | CHN | 45.73 | 126.60 | 0.71 |
| Heihe | CHN | 50.23 | 127.47 | 0.74 |
| Jiamusi | CHN | 46.80 | 130.35 | 0.67 |
| Panjin | CHN | 41.12 | 122.07 | 0.96 |
| Panshi | CHN | 42.92 | 126.03 | 0.62 |
| Tongjiang | CHN | 47.63 | 132.50 | 0.69 |
| Chvaletice | CZE | 50.02 | 15.43 | 0.26 |
| Usti nad Labem | CZE | 50.67 | 14.03 | 0.24 |
| Aken | DEU | 51.85 | 12.03 | 0.35 |
| Andernach | DEU | 50.42 | 7.38 | 0.47 |
| Anklam | DEU | 53.87 | 13.68 | 0.65 |
| Aschaffenburg | DEU | 49.95 | 9.17 | 0.38 |
| Barth | DEU | 54.37 | 12.73 | 0.65 |
| Bendorf | DEU | 50.42 | 7.58 | 0.45 |
| Berlin | DEU | 52.53 | 13.42 | 0.33 |
| Berne | DEU | 53.18 | 10.50 | 0.43 |
| Bingen | DEU | 49.95 | 7.90 | 0.45 |
| Bodenwerder | DEU | 51.97 | 9.50 | 0.43 |
| Boizenburg | DEU | 53.38 | 10.73 | 0.43 |
| Bonn | DEU | 50.72 | 7.08 | 0.53 |
| Brandenburg | DEU | 52.40 | 12.52 | 0.35 |
| Braunschweig | DEU | 52.25 | 10.50 | 0.41 |
| Brohl | DEU | 50.42 | 7.30 | 0.44 |
| Castrop Rauxel | DEU | 51.55 | 7.30 | 0.53 |
| Cologne | DEU | 50.93 | 7.00 | 0.56 |

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|---|---|---|---|---|
| Deggendorf | DEU | 48.83 | 12.97 | 0.27 |
| Dormagen | DEU | 51.10 | 6.95 | 0.57 |
| Dortmund | DEU | 51.53 | 7.45 | 0.53 |
| Duisburg | DEU | 51.43 | 6.75 | 0.57 |
| Dusseldorf | DEU | 51.25 | 6.77 | 0.57 |
| Eisenhuttenstadt | DEU | 52.15 | 14.62 | 0.25 |
| Emmerich | DEU | 51.85 | 6.25 | 0.56 |
| Erftstadt | DEU | 50.80 | 6.75 | 0.51 |
| Essen | DEU | 51.45 | 7.02 | 0.53 |
| Frankfurt | DEU | 50.12 | 8.67 | 0.41 |
| Geesthacht | DEU | 53.43 | 10.38 | 0.44 |
| Gelsenkirchen | DEU | 51.50 | 7.08 | 0.53 |
| Germersheim | DEU | 49.22 | 8.38 | 0.55 |
| Gernsheim | DEU | 49.75 | 8.47 | 0.48 |
| Greifswald | DEU | 54.10 | 13.38 | 0.69 |
| Haren | DEU | 52.80 | 7.25 | 0.62 |
| Havelberg | DEU | 52.83 | 12.07 | 0.36 |
| Heringsdorf | DEU | 53.97 | 14.17 | 0.64 |
| Hohenhorn | DEU | 53.47 | 10.37 | 0.44 |
| Homberg | DEU | 51.45 | 6.72 | 0.57 |
| Hoya | DEU | 52.80 | 9.13 | 0.45 |
| Ibbenburen | DEU | 52.28 | 7.73 | 0.50 |
| Karlsruhe | DEU | 49.05 | 8.33 | 0.56 |
| Kehl | DEU | 48.58 | 7.83 | 0.51 |
| Koblenz | DEU | 50.33 | 7.58 | 0.42 |
| Krefeld | DEU | 51.33 | 6.57 | 0.57 |
| Kroslin | DEU | 54.13 | 13.75 | 0.76 |
| Ladebow | DEU | 54.10 | 13.45 | 0.69 |
| Lahnstein | DEU | 50.30 | 7.62 | 0.42 |
| Lauenburg | DEU | 53.38 | 10.55 | 0.43 |
| Lauterbach | DEU | 54.33 | 13.52 | 0.79 |
| Leer | DEU | 53.22 | 7.45 | 0.65 |
| Leeseringen | DEU | 52.58 | 9.13 | 0.45 |
| Leverkusen | DEU | 51.02 | 7.03 | 0.52 |
| Lubeck | DEU | 53.87 | 10.67 | 1.10 |
| Lubmin | DEU | 54.12 | 13.60 | 0.67 |
| Ludwigshafen am Rhein | DEU | 49.47 | 8.45 | 0.53 |
| Magdeburg | DEU | 52.13 | 11.62 | 0.34 |
| Mainz | DEU | 50.00 | 8.28 | 0.43 |
| Mannheim | DEU | 49.48 | 8.47 | 0.53 |
| Minden | DEU | 52.30 | 8.90 | 0.45 |
| Monheim | DEU | 51.12 | 6.82 | 0.56 |
| Moselkern | DEU | 50.18 | 7.37 | 0.43 |
| Mukran | DEU | 54.48 | 13.58 | 0.81 |
| Mulheim | DEU | 50.95 | 7.05 | 0.54 |

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|---|---|---|---|---|
| Neckarsteinach | DEU | 49.43 | 8.80 | 0.37 |
| Neuss | DEU | 51.20 | 6.70 | 0.57 |
| Neuss/Dusseldorf | DEU | 51.20 | 6.70 | 0.57 |
| Neustadt | DEU | 54.10 | 10.82 | 1.10 |
| Neuwied | DEU | 50.43 | 7.48 | 0.47 |
| Nienburg | DEU | 52.63 | 9.22 | 0.44 |
| Nuremberg | DEU | 49.45 | 11.05 | 0.29 |
| Oldersum | DEU | 53.32 | 7.33 | 0.98 |
| Orsoy | DEU | 51.53 | 6.68 | 0.57 |
| Osnabruck | DEU | 52.27 | 8.03 | 0.47 |
| Papenburg | DEU | 53.08 | 7.38 | 0.56 |
| Passau | DEU | 48.58 | 13.47 | 0.25 |
| Peenemunde | DEU | 54.12 | 13.77 | 0.76 |
| Peine | DEU | 52.32 | 10.22 | 0.42 |
| Porz | DEU | 50.88 | 7.05 | 0.54 |
| Regensburg | DEU | 49.02 | 12.12 | 0.24 |
| Remagen | DEU | 50.57 | 7.22 | 0.47 |
| Rheinhausen | DEU | 51.42 | 6.73 | 0.57 |
| Rinteln | DEU | 52.20 | 9.08 | 0.44 |
| Rosslau | DEU | 51.90 | 12.27 | 0.35 |
| Rostock | DEU | 54.15 | 12.10 | 0.70 |
| Ruhrort | DEU | 51.45 | 6.73 | 0.57 |
| Salzgitter | DEU | 52.22 | 10.33 | 0.42 |
| Sassnitz | DEU | 54.52 | 13.63 | 0.81 |
| Schlutup | DEU | 53.88 | 10.78 | 1.10 |
| Speyer | DEU | 49.30 | 8.43 | 0.55 |
| Stralsund | DEU | 54.32 | 13.10 | 0.70 |
| Sturzelberg | DEU | 51.12 | 6.80 | 0.56 |
| Stuttgart | DEU | 48.78 | 9.20 | 0.38 |
| Tangermunde | DEU | 52.57 | 11.97 | 0.36 |
| Travemunde | DEU | 53.97 | 10.90 | 1.10 |
| Ueckermunde | DEU | 53.73 | 14.28 | 0.73 |
| Urdingen | DEU | 51.35 | 6.67 | 0.57 |
| Vallendar | DEU | 50.40 | 7.62 | 0.45 |
| Vierow | DEU | 54.10 | 13.57 | 0.67 |
| Walsum | DEU | 51.53 | 6.68 | 0.57 |
| Warnemunde | DEU | 54.18 | 12.08 | 0.71 |
| Weissenthurm | DEU | 50.42 | 7.48 | 0.47 |
| Wesel | DEU | 51.65 | 6.60 | 0.57 |
| Wesseling | DEU | 50.83 | 7.00 | 0.51 |
| Westerende-Kirchloog | DEU | 53.43 | 7.42 | 0.96 |
| Wolgast | DEU | 54.05 | 13.78 | 0.76 |
| Worms | DEU | 49.63 | 8.35 | 0.50 |
| Wurzburg | DEU | 49.78 | 9.93 | 0.33 |
| Aggersund | DNK | 57.02 | 9.28 | 0.80 |

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|---|---|---|---|---|
| Allinge | DNK | 55.28 | 14.80 | 0.88 |
| Fur | DNK | 56.83 | 9.00 | 0.80 |
| Gudhjem | DNK | 55.22 | 14.97 | 0.73 |
| Hammeren | DNK | 55.28 | 14.75 | 0.88 |
| Hammerhavn | DNK | 55.27 | 14.75 | 0.88 |
| Hasle | DNK | 55.18 | 14.70 | 0.88 |
| Hvalpsund | DNK | 56.68 | 9.20 | 0.55 |
| Logstor | DNK | 56.97 | 9.25 | 0.55 |
| Nekso | DNK | 55.07 | 15.15 | 0.78 |
| Nykobing | DNK | 56.80 | 8.87 | 0.76 |
| Ronne | DNK | 55.10 | 14.70 | 0.88 |
| Skarrehage | DNK | 56.95 | 8.87 | 0.72 |
| Skive | DNK | 56.57 | 9.03 | 0.55 |
| Stege | DNK | 54.98 | 12.28 | 0.84 |
| Struer | DNK | 56.50 | 8.60 | 1.09 |
| Stubbekobing | DNK | 54.88 | 12.03 | 0.79 |
| Svaneke | DNK | 55.13 | 15.15 | 0.78 |
| Tejn | DNK | 55.23 | 14.83 | 0.88 |
| Thisted | DNK | 56.95 | 8.70 | 0.64 |
| Vang | DNK | 55.27 | 14.75 | 0.88 |
| Bekker | EST | 59.45 | 24.67 | 0.60 |
| Dirhami | EST | 59.22 | 23.50 | 0.82 |
| Forby | EST | 59.00 | 23.17 | 0.77 |
| Haapsalu | EST | 58.95 | 23.53 | 0.59 |
| Heltermaa | EST | 58.87 | 23.07 | 0.66 |
| Kuivastu | EST | 58.58 | 23.40 | 0.64 |
| Kunda | EST | 59.52 | 26.55 | 0.80 |
| Lehtma | EST | 59.05 | 22.70 | 0.85 |
| Loksa | EST | 59.58 | 25.72 | 0.79 |
| Meeruse | EST | 59.45 | 24.68 | 0.59 |
| Miiduranna | EST | 59.50 | 24.82 | 0.84 |
| Montu | EST | 57.95 | 22.12 | 0.70 |
| Muuga | EST | 59.50 | 24.97 | 0.84 |
| Narva Joesuu | EST | 59.47 | 28.05 | 0.57 |
| Paldiski | EST | 59.35 | 24.05 | 0.84 |
| Paljassaare | EST | 59.45 | 24.70 | 0.59 |
| Parnu | EST | 58.38 | 24.48 | 0.52 |
| Peetri | EST | 59.45 | 24.73 | 0.59 |
| Prangli Island | EST | 59.63 | 25.00 | 0.78 |
| Rohukula | EST | 58.90 | 23.42 | 0.65 |
| Roomassaare | EST | 58.22 | 22.52 | 0.65 |
| Saaremaa Harbour | EST | 58.53 | 22.23 | 0.69 |
| Sillamae | EST | 59.40 | 27.78 | 0.57 |
| Tallinn | EST | 59.45 | 24.75 | 0.59 |
| Veere | EST | 58.45 | 22.05 | 0.62 |

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|---|---|---|---|---|
| Virtsu | EST | 58.58 | 23.55 | 0.57 |
| Dalsbruk | FIN | 60.03 | 22.52 | 0.62 |
| Frojdbole | FIN | 60.15 | 19.92 | 1.03 |
| Galtby | FIN | 60.18 | 21.58 | 0.89 |
| Hamina | FIN | 60.57 | 27.18 | 0.55 |
| Hanko | FIN | 59.82 | 22.97 | 0.88 |
| Helsinki | FIN | 60.17 | 24.95 | 0.54 |
| Houtskar | FIN | 60.22 | 21.37 | 0.91 |
| Imatra | FIN | 61.17 | 28.83 | 0.47 |
| Inkoo | FIN | 60.05 | 24.02 | 0.70 |
| Isnas | FIN | 60.40 | 26.00 | 0.61 |
| Joensuu | FIN | 62.60 | 29.75 | 0.62 |
| Joutseno | FIN | 61.13 | 28.48 | 0.46 |
| Kantvik | FIN | 60.08 | 24.38 | 0.68 |
| Kaskinen | FIN | 62.38 | 21.22 | 1.06 |
| Kaukas | FIN | 61.07 | 28.22 | 0.46 |
| Kaukopaa | FIN | 61.25 | 28.87 | 0.51 |
| Kemi | FIN | 65.73 | 24.57 | 0.93 |
| Kokkila | FIN | 60.33 | 22.87 | 0.64 |
| Korpo | FIN | 60.15 | 21.55 | 0.89 |
| Kotka | FIN | 60.47 | 26.95 | 0.76 |
| Koverhar | FIN | 59.88 | 23.22 | 0.87 |
| Kristiinankaupunki | FIN | 62.27 | 21.32 | 0.67 |
| Kronvik | FIN | 63.05 | 21.52 | 0.73 |
| Kuopio | FIN | 62.85 | 27.50 | 0.57 |
| Kustavi | FIN | 60.57 | 21.33 | 0.67 |
| Kuuslahti | FIN | 63.12 | 27.75 | 0.56 |
| Lapaluoto | FIN | 64.67 | 24.42 | 0.85 |
| Lappeenranta | FIN | 61.07 | 28.25 | 0.46 |
| Lappohja | FIN | 59.90 | 23.27 | 0.88 |
| Lappvik | FIN | 59.90 | 23.27 | 0.88 |
| Lauritsala | FIN | 61.08 | 28.33 | 0.46 |
| Loviisa | FIN | 60.45 | 26.23 | 0.58 |
| Luvia | FIN | 61.33 | 21.57 | 0.67 |
| Mantyluoto | FIN | 61.58 | 21.50 | 0.68 |
| Martinniemi | FIN | 65.22 | 25.28 | 0.83 |
| Maxmo | FIN | 63.20 | 22.03 | 0.76 |
| Merikarvia | FIN | 61.85 | 21.47 | 0.71 |
| Mjosund | FIN | 60.22 | 22.47 | 0.61 |
| Mustola | FIN | 61.07 | 28.30 | 0.46 |
| Naantali | FIN | 60.47 | 22.02 | 0.62 |
| Nyhamn | FIN | 62.17 | 21.33 | 0.67 |
| Olkiluoto | FIN | 61.25 | 21.50 | 0.64 |
| Oulu | FIN | 65.00 | 25.47 | 0.80 |
| Parainen | FIN | 60.28 | 22.30 | 0.61 |

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|---|---|---|---|---|
| Pateniemi | FIN | 65.08 | 25.40 | 0.82 |
| Perno | FIN | 60.45 | 26.05 | 0.60 |
| Pori | FIN | 61.48 | 21.80 | 0.70 |
| Puhos | FIN | 62.10 | 29.92 | 0.58 |
| Raahe | FIN | 64.68 | 24.48 | 0.87 |
| Rahja | FIN | 64.20 | 23.73 | 0.84 |
| Rauma | FIN | 61.13 | 21.50 | 0.66 |
| Ristiina | FIN | 61.53 | 27.42 | 0.53 |
| Roytta | FIN | 65.77 | 24.15 | 0.93 |
| Salo | FIN | 60.38 | 23.17 | 0.67 |
| Savonlinna | FIN | 61.90 | 28.92 | 0.54 |
| Siilinjarvi | FIN | 63.08 | 27.67 | 0.56 |
| Sipoo | FIN | 60.37 | 25.32 | 0.62 |
| Skogby | FIN | 59.92 | 23.32 | 0.88 |
| Skoldvik | FIN | 60.30 | 25.55 | 0.58 |
| Skuru | FIN | 60.10 | 23.55 | 0.68 |
| Stromma | FIN | 60.18 | 22.90 | 0.64 |
| Summa | FIN | 60.53 | 27.12 | 0.55 |
| Svartback | FIN | 60.28 | 25.53 | 0.58 |
| Taalintehdas | FIN | 60.02 | 22.52 | 0.62 |
| Tammisaari | FIN | 59.98 | 23.43 | 0.64 |
| Teijo | FIN | 60.25 | 22.95 | 0.64 |
| Tolkkinen | FIN | 60.33 | 25.58 | 0.58 |
| Tornio | FIN | 65.85 | 24.15 | 0.92 |
| Tupavuori | FIN | 60.45 | 22.07 | 0.62 |
| Turku | FIN | 60.43 | 22.22 | 0.61 |
| Uusikaupunki | FIN | 60.80 | 21.40 | 0.66 |
| Vaasa | FIN | 63.10 | 21.62 | 0.73 |
| Valkom | FIN | 60.42 | 26.27 | 0.58 |
| Varkaus | FIN | 62.33 | 27.83 | 0.52 |
| Vartsala | FIN | 60.33 | 23.02 | 0.66 |
| Vastanfjard | FIN | 60.05 | 22.65 | 0.62 |
| Veitsiluoto | FIN | 65.70 | 24.62 | 0.93 |
| Abbeville | FRA | 50.10 | 1.85 | 0.91 |
| Ambes | FRA | 45.03 | -0.60 | 1.06 |
| Annay sous Lens | FRA | 50.47 | 2.87 | 0.64 |
| Bassens | FRA | 44.90 | -0.53 | 1.09 |
| Bethune | FRA | 50.53 | 2.63 | 0.68 |
| Blaye | FRA | 45.12 | -0.67 | 1.08 |
| Bonnieres | FRA | 49.03 | 1.58 | 0.68 |
| Bordeaux | FRA | 44.83 | -0.57 | 1.09 |
| Chalon-sur-Saone | FRA | 46.78 | 4.83 | 0.63 |
| Conflans | FRA | 48.98 | 2.10 | 0.70 |
| Cordemais | FRA | 47.27 | -1.88 | 0.98 |
| Duclair | FRA | 49.45 | 0.87 | 0.74 |

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|---|---|---|---|---|
| Elbeuf | FRA | 49.28 | 1.12 | 0.71 |
| Fontenay le Comte | FRA | 46.47 | -0.78 | 1.07 |
| Gaillon | FRA | 49.17 | 1.32 | 0.68 |
| Grand Couronne | FRA | 49.37 | 0.98 | 0.74 |
| Grigny | FRA | 45.62 | 4.78 | 0.71 |
| Ingrandes | FRA | 47.40 | -0.92 | 0.86 |
| Izon | FRA | 44.95 | -0.37 | 1.06 |
| La Mailleraye | FRA | 49.48 | 0.77 | 0.74 |
| Le Pouzin | FRA | 44.75 | 4.75 | 0.96 |
| Le Trait | FRA | 49.47 | 0.80 | 0.74 |
| Les Andelys | FRA | 49.25 | 1.43 | 0.68 |
| Libourne | FRA | 44.92 | -0.23 | 1.07 |
| Lille | FRA | 50.65 | 3.08 | 0.64 |
| Lillebonne | FRA | 49.52 | 0.53 | 0.78 |
| Limay | FRA | 48.97 | 1.78 | 0.66 |
| Lyon | FRA | 45.77 | 4.83 | 0.71 |
| Mantes | FRA | 48.98 | 1.72 | 0.66 |
| Nantes | FRA | 47.23 | -1.57 | 0.91 |
| Nort-sur-Erdre | FRA | 47.43 | -1.50 | 0.90 |
| Noyelles | FRA | 50.18 | 1.72 | 1.09 |
| Paimboeuf | FRA | 47.28 | -2.03 | 1.07 |
| Paris | FRA | 48.87 | 2.33 | 0.75 |
| Pauillac | FRA | 45.20 | -0.75 | 1.09 |
| Petit Couronne | FRA | 49.37 | 1.00 | 0.74 |
| Port Jerome | FRA | 49.47 | 0.53 | 0.80 |
| Radicatel | FRA | 49.42 | 0.48 | 0.82 |
| Redon | FRA | 47.65 | -2.07 | 0.98 |
| Rouen | FRA | 49.48 | 1.08 | 0.72 |
| St. Etienne du Rouvray | FRA | 49.37 | 1.12 | 0.72 |
| St. Wandrille | FRA | 49.53 | 0.75 | 0.74 |
| Strasbourg | FRA | 48.57 | 7.70 | 0.51 |
| Vernon | FRA | 49.08 | 1.48 | 0.68 |
| Villeneuve-la-Garenne | FRA | 48.92 | 2.30 | 0.75 |
| Villeneuve-le-Roi | FRA | 48.73 | 2.40 | 0.77 |
| Villequier | FRA | 49.50 | 0.67 | 0.77 |
| Acton Grange | GBR | 53.37 | -2.63 | 0.91 |
| Alloa | GBR | 56.10 | -3.80 | 0.94 |
| Althorpe Wharf | GBR | 53.57 | -0.73 | 0.75 |
| Anderton | GBR | 53.27 | -2.52 | 0.82 |
| Aylesford | GBR | 51.27 | 0.47 | 0.80 |
| Barton | GBR | 53.47 | -2.37 | 0.80 |
| Beckingham | GBR | 53.40 | -0.83 | 0.72 |
| Beverley | GBR | 53.85 | -0.43 | 0.83 |
| Bowling | GBR | 55.93 | -4.50 | 0.91 |
| Burton upon Stather | GBR | 53.65 | -0.68 | 0.76 |

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|---|---|---|---|---|
| Dalmuir | GBR | 55.90 | -4.43 | 0.86 |
| Drax | GBR | 53.73 | -0.98 | 0.74 |
| Dumbarton | GBR | 55.93 | -4.57 | 0.96 |
| Dunglass | GBR | 55.93 | -4.52 | 0.91 |
| Faslane Dock | GBR | 56.07 | -4.82 | 1.04 |
| Finnart | GBR | 56.12 | -4.83 | 1.04 |
| Flixborough | GBR | 53.62 | -0.68 | 0.75 |
| Frodsham | GBR | 53.30 | -2.73 | 1.00 |
| Gainsborough | GBR | 53.40 | -0.77 | 0.72 |
| Garelochhead | GBR | 56.08 | -4.83 | 1.06 |
| Glasgow | GBR | 55.87 | -4.28 | 0.84 |
| Glenmallan | GBR | 56.12 | -4.82 | 1.02 |
| Gloucester | GBR | 51.87 | -2.22 | 0.76 |
| Goole | GBR | 53.70 | -0.87 | 0.77 |
| Grove Wharf | GBR | 53.60 | -0.68 | 0.75 |
| Gunness | GBR | 53.58 | -0.72 | 0.75 |
| Gunness Wharf | GBR | 53.58 | -0.68 | 0.75 |
| Halling | GBR | 51.37 | 0.01 | 0.75 |
| Howdendyke | GBR | 53.75 | -0.87 | 0.77 |
| Irlam | GBR | 53.43 | -2.42 | 0.82 |
| Irwell | GBR | 53.47 | -2.35 | 0.80 |
| Keadby | GBR | 53.60 | -0.67 | 0.75 |
| Knottingley | GBR | 53.72 | -1.23 | 0.75 |
| Latchford | GBR | 53.38 | -2.57 | 0.88 |
| London | GBR | 51.50 | -0.07 | 0.76 |
| Manchester | GBR | 53.47 | -2.28 | 0.79 |
| Neap House | GBR | 53.62 | -0.67 | 0.75 |
| Northwich | GBR | 53.27 | -2.53 | 0.82 |
| Old Kilpatrick | GBR | 55.92 | -4.45 | 0.86 |
| Paisley | GBR | 55.85 | -4.43 | 0.86 |
| Partington | GBR | 53.43 | -2.43 | 0.82 |
| Perth | GBR | 56.40 | -3.43 | 0.90 |
| Renfrew | GBR | 55.87 | -4.40 | 0.86 |
| Rochester | GBR | 51.40 | 0.50 | 0.93 |
| Selby | GBR | 53.78 | -1.07 | 0.74 |
| Shandon | GBR | 56.05 | -4.82 | 1.04 |
| Snodland | GBR | 51.33 | 0.45 | 0.85 |
| Thorne | GBR | 53.62 | -0.97 | 0.73 |
| Tilbury | GBR | 51.45 | 0.33 | 1.08 |
| Warrington | GBR | 53.40 | -2.60 | 0.88 |
| Winnington | GBR | 53.28 | -2.52 | 0.82 |
| Wisbech | GBR | 52.65 | 0.15 | 0.99 |
| Budapest | HUN | 47.50 | 19.03 | 0.69 |
| Aughinish Island | IRL | 52.63 | -9.05 | 1.09 |
| Dernish Island | IRL | 52.68 | -8.92 | 0.98 |

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|---|---|---|---|---|
| Limerick | IRL | 52.67 | -8.63 | 0.92 |
| Adria | ITA | 45.05 | 12.07 | 1.09 |
| Boretto | ITA | 44.90 | 10.55 | 1.08 |
| Cremona | ITA | 45.13 | 10.02 | 1.02 |
| Donada | ITA | 45.05 | 12.22 | 1.09 |
| Pavia | ITA | 45.18 | 9.13 | 1.00 |
| Klaipeda | LTU | 55.72 | 21.13 | 0.57 |
| Engure | LVA | 57.17 | 23.23 | 0.70 |
| Labrags | LVA | 56.98 | 21.37 | 0.79 |
| Liepaja | LVA | 56.52 | 21.02 | 0.70 |
| Mersrags | LVA | 57.37 | 23.13 | 0.66 |
| Pavilosta | LVA | 56.90 | 21.18 | 0.68 |
| Riga | LVA | 56.97 | 24.10 | 0.50 |
| Roja | LVA | 57.50 | 22.82 | 0.65 |
| Salacgriva | LVA | 57.75 | 24.37 | 0.56 |
| Skulte | LVA | 57.32 | 24.40 | 0.53 |
| Ventspils | LVA | 57.40 | 21.55 | 0.70 |
| Chisinau | MDA | 47.02 | 28.83 | 0.55 |
| Aalst | NLD | 51.38 | 5.45 | 0.58 |
| Alblasserdam | NLD | 51.87 | 4.62 | 0.52 |
| Ameide | NLD | 51.95 | 4.95 | 0.50 |
| Amsterdam | NLD | 52.37 | 4.90 | 0.88 |
| Arnhem | NLD | 51.97 | 5.88 | 0.56 |
| Assen | NLD | 53.00 | 6.57 | 0.64 |
| Axel Sassing | NLD | 51.28 | 3.87 | 0.76 |
| Bergambacht | NLD | 51.93 | 4.78 | 0.50 |
| Bergen-op-Zoom | NLD | 51.50 | 4.27 | 0.80 |
| Bergum | NLD | 53.20 | 5.98 | 0.94 |
| Bolnes | NLD | 51.90 | 4.57 | 0.52 |
| Bruinisse | NLD | 51.67 | 4.10 | 0.73 |
| Buitenhuizen | NLD | 52.43 | 4.72 | 1.06 |
| Capelle aan den Yssel | NLD | 51.92 | 4.57 | 0.52 |
| Culemborg | NLD | 51.95 | 5.22 | 0.58 |
| Deest | NLD | 51.88 | 5.67 | 0.57 |
| Den Bommel | NLD | 51.72 | 4.28 | 0.69 |
| Dintelmond | NLD | 51.67 | 4.38 | 0.63 |
| Dinteloord | NLD | 51.63 | 4.37 | 0.64 |
| Dodewaard | NLD | 51.90 | 5.63 | 0.57 |
| Dordrecht | NLD | 51.80 | 4.65 | 0.52 |
| Drachten | NLD | 53.12 | 6.10 | 0.95 |
| Druten | NLD | 51.88 | 5.62 | 0.57 |
| Eindhoven | NLD | 51.43 | 5.50 | 0.58 |
| Fijnaart | NLD | 51.63 | 4.48 | 0.62 |
| Geertruidenberg | NLD | 51.72 | 4.87 | 0.59 |
| Gendt | NLD | 51.87 | 5.98 | 0.56 |

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|---|---|---|---|---|
| Gorinchem | NLD | 51.82 | 4.98 | 0.59 |
| Grave | NLD | 51.75 | 5.75 | 0.58 |
| Groot-Ammers | NLD | 51.92 | 4.83 | 0.50 |
| Grouw | NLD | 53.10 | 5.85 | 0.97 |
| Hansweert | NLD | 51.45 | 4.00 | 0.97 |
| Hardinxveld | NLD | 51.82 | 4.85 | 0.50 |
| Heerenveen | NLD | 52.95 | 5.92 | 0.96 |
| Heerewaarden | NLD | 51.82 | 5.38 | 0.58 |
| Heerjansdam | NLD | 51.83 | 4.57 | 0.52 |
| Heijen | NLD | 51.68 | 5.98 | 0.57 |
| Hellevoetsluis | NLD | 51.82 | 4.13 | 0.83 |
| Hendrik Ido Ambacht | NLD | 51.85 | 4.62 | 0.52 |
| Heusden | NLD | 51.73 | 5.15 | 0.58 |
| Huissen | NLD | 51.92 | 5.92 | 0.56 |
| Kinderdijk | NLD | 51.88 | 4.63 | 0.52 |
| Krimpen aan den Yssel | NLD | 51.90 | 4.58 | 0.52 |
| Lekkerkerk | NLD | 51.92 | 4.63 | 0.52 |
| Lithoyen | NLD | 51.82 | 5.43 | 0.58 |
| Lobith | NLD | 51.87 | 6.13 | 0.56 |
| Maasbracht | NLD | 51.13 | 5.87 | 0.56 |
| Maashees | NLD | 51.57 | 6.03 | 0.58 |
| Maassluis | NLD | 51.92 | 4.25 | 0.61 |
| Maastricht | NLD | 50.85 | 5.68 | 0.55 |
| Made | NLD | 51.68 | 4.80 | 0.60 |
| Middelharnis | NLD | 51.78 | 4.20 | 0.76 |
| Millingen aan den Rijn | NLD | 51.87 | 6.03 | 0.56 |
| Moerdijk | NLD | 51.70 | 4.62 | 0.63 |
| Nieuw Lekkerland | NLD | 51.88 | 4.63 | 0.52 |
| Nieuwerkerk aan den Yssel | NLD | 51.97 | 4.58 | 0.52 |
| Nijmegen | NLD | 51.83 | 5.83 | 0.58 |
| Numansdorp | NLD | 51.72 | 4.42 | 0.67 |
| Odijk | NLD | 52.03 | 5.22 | 1.02 |
| Ooltgensplaat | NLD | 51.68 | 4.33 | 0.66 |
| Oosterhout | NLD | 51.62 | 4.87 | 0.59 |
| Oss | NLD | 51.77 | 5.52 | 0.58 |
| Ouderkerk | NLD | 51.93 | 4.60 | 0.52 |
| Oudewater | NLD | 52.03 | 4.88 | 0.90 |
| Ouwerkerk | NLD | 51.63 | 3.98 | 0.83 |
| Overschie | NLD | 51.93 | 4.42 | 0.54 |
| Paal | NLD | 51.35 | 4.12 | 0.80 |
| Papendrecht | NLD | 51.83 | 4.63 | 0.52 |
| Raamsdonksveer | NLD | 51.70 | 4.92 | 0.59 |
| Renkum | NLD | 51.97 | 5.73 | 0.56 |
| Rhenen | NLD | 51.95 | 5.57 | 0.57 |
| Ridderkerk | NLD | 51.87 | 4.58 | 0.52 |

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|---|---|---|---|---|
| Rijswijk | NLD | 51.78 | 5.02 | 0.58 |
| Roermond | NLD | 51.20 | 5.98 | 0.57 |
| Rotterdam | NLD | 51.90 | 4.48 | 0.54 |
| Sas van Ghent | NLD | 51.23 | 3.80 | 0.69 |
| Schiedam | NLD | 51.90 | 4.40 | 0.56 |
| 'sGravendeel | NLD | 51.77 | 4.60 | 0.52 |
| 'sHertogenbosch | NLD | 51.70 | 5.30 | 0.60 |
| Sliedrecht | NLD | 51.83 | 4.75 | 0.50 |
| Slikkerveer | NLD | 51.88 | 4.60 | 0.52 |
| Sluiskil | NLD | 51.30 | 3.83 | 0.76 |
| Spijk | NLD | 51.87 | 5.05 | 0.58 |
| St. Annaland | NLD | 51.62 | 4.10 | 0.62 |
| Stavenisse | NLD | 51.58 | 4.00 | 0.83 |
| Stein | NLD | 50.97 | 5.77 | 0.55 |
| Stellendam | NLD | 51.80 | 4.02 | 1.02 |
| Swalmen | NLD | 51.22 | 6.02 | 0.56 |
| Tegelen | NLD | 51.35 | 6.13 | 0.57 |
| Tiel | NLD | 51.88 | 5.45 | 0.57 |
| Tilburg | NLD | 51.55 | 5.07 | 0.58 |
| Venlo | NLD | 51.37 | 6.17 | 0.57 |
| Vlaardingen | NLD | 51.90 | 4.35 | 0.56 |
| Waalwijk | NLD | 51.70 | 5.07 | 0.58 |
| Wageningen | NLD | 51.97 | 5.67 | 0.57 |
| Walsoorden | NLD | 51.45 | 4.03 | 0.96 |
| Wanssum | NLD | 51.53 | 6.08 | 0.58 |
| Wartena | NLD | 53.15 | 5.90 | 0.79 |
| Wemeldinge | NLD | 51.52 | 4.00 | 1.01 |
| Werkendam | NLD | 51.80 | 4.90 | 0.50 |
| Willemstad | NLD | 51.68 | 4.40 | 0.65 |
| Wolphaartsdijk | NLD | 51.53 | 3.82 | 0.87 |
| Wormerveer | NLD | 52.47 | 4.78 | 1.04 |
| Yerseke | NLD | 51.50 | 4.05 | 1.01 |
| Zaltbommel | NLD | 51.80 | 5.20 | 0.59 |
| Zeist | NLD | 52.08 | 5.23 | 1.02 |
| Zierikzee | NLD | 51.63 | 3.88 | 0.88 |
| Zuilichem | NLD | 51.80 | 5.12 | 0.59 |
| Zwijndrecht | NLD | 51.82 | 4.65 | 0.52 |
| Aakra | NOR | 59.78 | 6.10 | 1.08 |
| Askoy | NOR | 60.40 | 5.17 | 1.07 |
| Bergen | NOR | 60.40 | 5.32 | 1.05 |
| Dolvik | NOR | 60.32 | 5.25 | 1.06 |
| Etne | NOR | 59.67 | 5.95 | 1.04 |
| Fiborgtangen | NOR | 63.72 | 11.17 | 0.93 |
| Florvaag | NOR | 60.45 | 5.22 | 1.00 |
| Follafoss | NOR | 63.98 | 11.10 | 1.05 |

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|---|---|---|---|---|
| Fusa | NOR | 60.20 | 5.62 | 1.06 |
| Garnes | NOR | 60.43 | 5.48 | 1.01 |
| Heroysund | NOR | 59.92 | 5.78 | 1.02 |
| Herre | NOR | 59.10 | 9.53 | 0.79 |
| Hommelvik | NOR | 63.42 | 10.80 | 1.04 |
| Hoylandsbygdi | NOR | 59.77 | 5.78 | 0.91 |
| Hoylandssundet | NOR | 59.78 | 5.80 | 0.90 |
| Husnes | NOR | 59.87 | 5.77 | 1.02 |
| Knarrevik | NOR | 60.37 | 5.17 | 1.07 |
| Kvinesdal | NOR | 58.30 | 7.00 | 1.04 |
| Laksevaag | NOR | 60.38 | 5.30 | 1.05 |
| Langangen | NOR | 59.08 | 9.80 | 0.99 |
| Levanger | NOR | 63.75 | 11.30 | 0.95 |
| Lofallstrand | NOR | 60.02 | 6.00 | 0.82 |
| Malm | NOR | 64.07 | 11.22 | 1.02 |
| Malvik | NOR | 63.42 | 10.63 | 1.02 |
| Menstad | NOR | 59.17 | 9.65 | 0.73 |
| Muruvik | NOR | 63.43 | 10.85 | 1.03 |
| Nordveitgrend | NOR | 60.10 | 5.73 | 0.98 |
| Nystrand | NOR | 59.10 | 9.72 | 1.05 |
| Olen | NOR | 59.60 | 5.83 | 0.98 |
| Omastrand | NOR | 60.22 | 5.97 | 1.08 |
| Onarheim | NOR | 59.95 | 5.65 | 1.03 |
| Porsgrunn | NOR | 59.13 | 9.65 | 0.79 |
| Rubbestadneset | NOR | 59.82 | 5.28 | 1.09 |
| Skaalevik | NOR | 60.37 | 5.22 | 1.08 |
| Skaanevik | NOR | 59.75 | 5.93 | 1.03 |
| Skien | NOR | 59.20 | 9.62 | 0.81 |
| Steinkjer | NOR | 64.02 | 11.50 | 1.01 |
| Stjordal | NOR | 63.45 | 10.88 | 1.03 |
| Trondheim | NOR | 63.43 | 10.40 | 1.01 |
| Tyssebotn | NOR | 60.62 | 5.58 | 1.02 |
| Vaksdal | NOR | 60.48 | 5.75 | 1.06 |
| Verdal | NOR | 63.78 | 11.43 | 0.98 |
| Darlowo | POL | 54.43 | 16.38 | 0.60 |
| Elblag | POL | 54.17 | 19.40 | 0.59 |
| Frombork | POL | 54.35 | 19.67 | 0.62 |
| Gdansk | POL | 54.35 | 18.65 | 0.72 |
| Gdynia | POL | 54.53 | 18.55 | 0.77 |
| Kolobrzeg | POL | 54.18 | 15.57 | 0.63 |
| Kozle | POL | 50.32 | 18.13 | 0.24 |
| Niechorze | POL | 54.10 | 15.07 | 0.61 |
| Nowa Sol | POL | 51.80 | 15.72 | 0.30 |
| Plock | POL | 52.53 | 19.67 | 0.14 |
| Police | POL | 53.55 | 14.60 | 0.63 |

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|---|---|---|---|---|
| Puck | POL | 54.72 | 18.35 | 0.66 |
| Stepnica | POL | 53.65 | 14.63 | 0.63 |
| Swinoujscie | POL | 53.93 | 14.28 | 0.73 |
| Szczecin | POL | 53.42 | 14.55 | 0.63 |
| Tczew | POL | 54.08 | 18.77 | 0.63 |
| Ustka | POL | 54.58 | 16.87 | 0.80 |
| Wladyslawowo | POL | 54.80 | 18.42 | 0.79 |
| Wroclaw | POL | 51.08 | 17.00 | 0.26 |
| Pyongyang | PRK | 39.00 | 125.75 | 0.97 |
| Songnim | PRK | 38.73 | 125.62 | 1.06 |
| Bazias | ROM | 44.80 | 21.40 | 0.68 |
| Braila | ROM | 45.25 | 27.98 | 0.76 |
| Bucharest | ROM | 44.42 | 26.12 | 0.77 |
| Calarasi | ROM | 44.18 | 27.32 | 0.83 |
| Galatz | ROM | 45.42 | 28.08 | 0.76 |
| Giurgiu | ROM | 43.90 | 25.97 | 0.84 |
| Oltenitza | ROM | 44.03 | 26.58 | 0.83 |
| Orsova | ROM | 44.70 | 22.37 | 0.49 |
| Tulcea | ROM | 45.17 | 28.82 | 0.68 |
| Turnu Severin | ROM | 44.63 | 22.67 | 0.73 |
| Akhtubinsk | RUS | 48.33 | 46.17 | 0.92 |
| Annenskiy Most | RUS | 60.72 | 37.08 | 0.60 |
| Astrakhan | RUS | 46.37 | 48.07 | 0.88 |
| Azov | RUS | 47.10 | 39.43 | 1.04 |
| Bagaevskaya | RUS | 47.32 | 40.38 | 0.80 |
| Balakhna | RUS | 56.48 | 43.62 | 0.32 |
| Balakovo | RUS | 52.07 | 47.77 | 0.55 |
| Baltiysk | RUS | 54.65 | 19.90 | 0.71 |
| Belyy Ruchey | RUS | 60.90 | 36.83 | 0.62 |
| Berezniki | RUS | 59.43 | 56.82 | 0.60 |
| Brusnichnoye | RUS | 60.78 | 28.73 | 0.55 |
| Cheboksary | RUS | 56.13 | 47.23 | 0.38 |
| Cherepovets | RUS | 59.15 | 37.83 | 0.46 |
| Chkalovsk | RUS | 56.75 | 43.23 | 0.34 |
| Gorokhovets | RUS | 56.18 | 42.70 | 0.32 |
| Kalach-na-Donu | RUS | 48.72 | 43.48 | 0.69 |
| Kaliningrad | RUS | 54.72 | 20.52 | 0.59 |
| Kamyshin | RUS | 50.08 | 45.40 | 0.67 |
| Kanonerskiy Island | RUS | 59.90 | 30.22 | 0.46 |
| Kazan | RUS | 55.75 | 49.17 | 0.38 |
| Khabarovsk | RUS | 48.50 | 135.17 | 0.66 |
| Kineshma | RUS | 57.45 | 42.12 | 0.39 |
| Kirovsk | RUS | 59.87 | 30.98 | 0.50 |
| Komsomolsk-na-Amure | RUS | 50.53 | 136.98 | 0.73 |
| Kondopoga | RUS | 62.20 | 34.28 | 0.63 |

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|---|---|---|---|---|
| Konstantinovsk | RUS | 47.55 | 41.10 | 0.75 |
| Kostroma | RUS | 57.77 | 40.93 | 0.36 |
| Kotlas | RUS | 61.25 | 46.65 | 0.62 |
| Krasnoyarsk | RUS | 56.08 | 92.77 | 0.61 |
| Krasnyye Barrikady | RUS | 46.20 | 47.85 | 0.91 |
| Kronshtadt | RUS | 60.00 | 29.77 | 0.50 |
| Lomonosov | RUS | 59.83 | 29.80 | 0.53 |
| Mago | RUS | 53.25 | 140.22 | 0.84 |
| Medvezhyegorsk | RUS | 62.93 | 34.47 | 0.72 |
| Mondoma | RUS | 59.93 | 37.47 | 0.57 |
| Naberezhnyye Chelny | RUS | 55.68 | 52.30 | 0.41 |
| Nadvoitsy | RUS | 63.93 | 34.33 | 0.81 |
| Navashino | RUS | 55.55 | 42.18 | 0.29 |
| Nikolayevsk | RUS | 53.13 | 140.72 | 0.88 |
| Nikolayevskaya | RUS | 47.60 | 41.48 | 0.77 |
| Nizhnekamsk | RUS | 55.42 | 51.88 | 0.42 |
| Nizhnetambovskoye | RUS | 50.93 | 138.17 | 0.75 |
| Nizhniy Novgorod | RUS | 56.33 | 44.00 | 0.33 |
| Nizhnyaya Gavan | RUS | 52.40 | 140.43 | 0.82 |
| Novgorod | RUS | 58.50 | 31.33 | 0.36 |
| Novocheboksarsk | RUS | 56.10 | 47.48 | 0.38 |
| Olya | RUS | 45.78 | 47.53 | 0.97 |
| Otradnoye | RUS | 59.77 | 30.80 | 0.49 |
| Pechora | RUS | 65.23 | 57.30 | 0.97 |
| Perm | RUS | 58.02 | 56.17 | 0.50 |
| Petrodvorets | RUS | 59.88 | 29.92 | 0.48 |
| Petrozavodsk | RUS | 61.77 | 34.32 | 0.64 |
| Pionerskiy | RUS | 54.93 | 20.20 | 0.59 |
| Podporozhye | RUS | 60.92 | 34.03 | 0.52 |
| Primorsk | RUS | 60.37 | 28.63 | 0.55 |
| Priozersk | RUS | 61.02 | 30.13 | 0.56 |
| Pudozh | RUS | 61.83 | 36.53 | 0.60 |
| Rostov | RUS | 47.17 | 39.70 | 1.05 |
| Rybinsk | RUS | 58.02 | 38.87 | 0.39 |
| Samara | RUS | 53.17 | 50.17 | 0.43 |
| Saratov | RUS | 51.50 | 45.92 | 0.58 |
| Segezha | RUS | 63.70 | 34.32 | 0.81 |
| Semikarakorsk | RUS | 47.55 | 41.10 | 0.75 |
| Shlisselburg | RUS | 59.93 | 31.13 | 0.50 |
| Solikamsk | RUS | 59.67 | 56.75 | 0.62 |
| Sosnovka | RUS | 56.23 | 51.28 | 0.41 |
| St. Petersburg | RUS | 59.93 | 30.30 | 0.46 |
| Svetlyy | RUS | 54.63 | 20.15 | 0.59 |
| Syzran | RUS | 53.17 | 48.48 | 0.44 |
| Taganrog | RUS | 47.20 | 38.95 | 1.06 |

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|---|---|---|---|---|
| Tatyanka | RUS | 45.93 | 48.28 | 0.97 |
| Tolyatti | RUS | 53.53 | 49.40 | 0.41 |
| Tomsk | RUS | 56.50 | 85.08 | 0.63 |
| Ust Donets | RUS | 47.67 | 40.95 | 0.75 |
| Ust-Luga | RUS | 59.67 | 28.30 | 0.56 |
| Volgodonsk | RUS | 47.50 | 42.12 | 0.76 |
| Volgograd | RUS | 48.75 | 44.50 | 0.77 |
| Volzhskiy | RUS | 48.82 | 44.73 | 0.85 |
| Voznesenye | RUS | 61.02 | 35.47 | 0.54 |
| Vyborg | RUS | 60.72 | 28.73 | 0.55 |
| Vysotsk | RUS | 60.63 | 28.57 | 0.54 |
| Vytegra | RUS | 61.07 | 36.45 | 0.56 |
| Yaroslavl | RUS | 57.57 | 39.87 | 0.35 |
| Zelenodolsk | RUS | 55.83 | 48.50 | 0.38 |
| Apatin | SCG | 45.67 | 19.00 | 0.66 |
| Belgrade | SCG | 44.80 | 20.47 | 0.80 |
| Bezdam | SCG | 45.83 | 18.93 | 0.66 |
| Kladovo | SCG | 44.60 | 22.55 | 0.73 |
| Mitrovica | SCG | 42.90 | 20.87 | 0.28 |
| Novi Becej | SCG | 45.58 | 20.13 | 0.70 |
| Novi Sad | SCG | 45.27 | 19.83 | 0.67 |
| Pancevo | SCG | 44.87 | 20.67 | 0.83 |
| Zrenjanin | SCG | 45.37 | 10.38 | 0.97 |
| Bratislava | SVK | 48.15 | 17.12 | 0.44 |
| Komarno | SVK | 47.77 | 18.08 | 0.52 |
| Aelvenaes | SWE | 59.37 | 13.18 | 0.49 |
| Ahus | SWE | 55.93 | 14.32 | 0.96 |
| Amal | SWE | 59.05 | 12.72 | 0.47 |
| Ar | SWE | 57.92 | 18.95 | 0.82 |
| Arvika | SWE | 59.67 | 12.58 | 0.51 |
| Balsta | SWE | 59.55 | 17.55 | 0.58 |
| Bergkvara | SWE | 56.38 | 16.08 | 0.88 |
| Borgholm | SWE | 56.88 | 16.65 | 0.82 |
| Bungenas | SWE | 57.82 | 19.08 | 0.81 |
| Byxelkrok | SWE | 57.30 | 17.03 | 0.81 |
| Dalaro | SWE | 59.13 | 18.42 | 0.83 |
| Degerhamn | SWE | 56.35 | 16.42 | 0.86 |
| Edsvalla | SWE | 59.43 | 13.23 | 0.49 |
| Elleholm | SWE | 56.17 | 14.73 | 0.69 |
| Enkoping | SWE | 59.63 | 17.08 | 0.64 |
| Farjestaden | SWE | 56.65 | 16.47 | 0.86 |
| Farosund | SWE | 57.87 | 19.07 | 0.81 |
| Fiskeback | SWE | 57.87 | 14.10 | 0.54 |
| Fittja | SWE | 59.23 | 17.85 | 0.52 |
| Forsmark | SWE | 60.42 | 18.20 | 0.91 |

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|---|---|---|---|---|
| Furillen | SWE | 57.77 | 19.00 | 0.77 |
| Furusund | SWE | 59.65 | 18.90 | 0.84 |
| Gamleby | SWE | 57.90 | 16.42 | 0.70 |
| Gefle | SWE | 60.67 | 17.17 | 0.74 |
| Grisslehamn | SWE | 60.10 | 18.82 | 0.92 |
| Gruvon | SWE | 59.33 | 13.12 | 0.48 |
| Hallekis | SWE | 58.67 | 13.42 | 0.46 |
| Hallstavik | SWE | 60.05 | 18.60 | 0.91 |
| Haparanda | SWE | 65.83 | 24.13 | 0.93 |
| Haraholmen | SWE | 65.23 | 21.63 | 0.87 |
| Hargshamn | SWE | 60.17 | 18.48 | 0.91 |
| Hasselby | SWE | 59.37 | 17.82 | 0.54 |
| Hernosand | SWE | 62.63 | 17.93 | 0.78 |
| Hoglunda | SWE | 59.42 | 13.25 | 0.49 |
| Hogmarso | SWE | 59.65 | 18.85 | 0.84 |
| Honsater | SWE | 58.63 | 13.45 | 0.46 |
| Hornefors | SWE | 63.62 | 19.90 | 0.80 |
| Hudiksvall | SWE | 61.72 | 17.12 | 0.97 |
| Iggesund | SWE | 61.65 | 17.10 | 0.97 |
| Kagehamn | SWE | 64.83 | 21.03 | 0.87 |
| Kalix | SWE | 65.85 | 23.13 | 0.99 |
| Kallvik | SWE | 57.88 | 16.72 | 0.92 |
| Kallviken | SWE | 64.33 | 21.37 | 0.82 |
| Kalmar | SWE | 56.67 | 16.37 | 0.86 |
| Kalmarsand | SWE | 59.53 | 17.52 | 0.58 |
| Kapellskar | SWE | 59.72 | 19.00 | 0.90 |
| Kappelshamn | SWE | 57.85 | 18.78 | 0.82 |
| Karlshamn | SWE | 56.17 | 14.87 | 0.73 |
| Karlskrona | SWE | 56.17 | 15.60 | 0.71 |
| Karlstad | SWE | 59.38 | 13.52 | 0.48 |
| Klintehamn | SWE | 57.38 | 18.20 | 0.71 |
| Koping | SWE | 59.52 | 16.00 | 0.60 |
| Kopmannebro | SWE | 58.77 | 12.52 | 0.42 |
| Kristinehamn | SWE | 59.32 | 14.12 | 0.48 |
| Krokstad | SWE | 59.10 | 12.92 | 0.45 |
| Kungsor | SWE | 59.43 | 16.10 | 0.56 |
| Kyrkebyn | SWE | 59.27 | 13.07 | 0.48 |
| Landsort | SWE | 58.73 | 17.87 | 0.88 |
| Lidkoping | SWE | 58.50 | 13.17 | 0.44 |
| Liljeholmsviken | SWE | 59.32 | 18.00 | 0.52 |
| Ljustero | SWE | 59.52 | 18.63 | 0.58 |
| Loudden | SWE | 59.33 | 18.13 | 0.52 |
| Lulea | SWE | 65.58 | 22.17 | 0.90 |
| Mariestad | SWE | 58.72 | 13.83 | 0.44 |
| Marsviken | SWE | 58.67 | 16.95 | 0.56 |

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|---|---|---|---|---|
| Mem | SWE | 58.48 | 16.42 | 0.55 |
| Monsteras | SWE | 57.03 | 16.47 | 0.71 |
| Morbylanga | SWE | 56.53 | 16.37 | 0.86 |
| Motala | SWE | 58.53 | 15.07 | 0.47 |
| Munksund | SWE | 65.28 | 21.48 | 0.89 |
| Norrkoping | SWE | 58.60 | 16.20 | 0.55 |
| Norrsundet | SWE | 60.95 | 17.17 | 0.72 |
| Norrtalje | SWE | 59.75 | 18.70 | 0.61 |
| Norsbron | SWE | 59.42 | 13.23 | 0.49 |
| Nykoping | SWE | 58.75 | 17.02 | 0.56 |
| Nynashamn | SWE | 58.90 | 17.95 | 0.89 |
| Oaxen | SWE | 55.97 | 17.72 | 0.81 |
| Orebro | SWE | 59.28 | 15.18 | 0.49 |
| Oregrund | SWE | 60.33 | 18.45 | 0.90 |
| Ornskoldsvik | SWE | 63.27 | 18.72 | 0.80 |
| Oskarshamn | SWE | 57.27 | 16.45 | 0.71 |
| Otterbacken | SWE | 58.95 | 14.05 | 0.48 |
| Oxelosund | SWE | 58.67 | 17.12 | 0.88 |
| Pataholm | SWE | 56.92 | 16.43 | 0.85 |
| Ronehamn | SWE | 57.17 | 18.53 | 0.85 |
| Ronneby | SWE | 56.17 | 15.30 | 0.71 |
| Rundvik | SWE | 63.53 | 19.45 | 0.84 |
| Saffle | SWE | 59.13 | 12.93 | 0.45 |
| Sandhamn | SWE | 59.28 | 18.90 | 0.85 |
| Sankt Anna | SWE | 58.33 | 16.70 | 0.55 |
| Simpevarp | SWE | 57.42 | 16.67 | 0.95 |
| Simrishamn | SWE | 55.55 | 14.37 | 0.93 |
| Sjotorp | SWE | 58.83 | 14.00 | 0.46 |
| Skattkar | SWE | 59.42 | 13.70 | 0.48 |
| Skelleftea | SWE | 64.73 | 20.95 | 0.91 |
| Skoghall | SWE | 59.32 | 13.45 | 0.44 |
| Skutskar | SWE | 60.65 | 17.40 | 0.66 |
| Slite | SWE | 57.70 | 18.82 | 0.86 |
| Slottsbron | SWE | 59.33 | 13.10 | 0.48 |
| Soderhamn | SWE | 61.32 | 17.10 | 0.99 |
| Soderkoping | SWE | 58.48 | 16.33 | 0.56 |
| Sodertalje | SWE | 59.20 | 17.63 | 0.82 |
| Solvesborg | SWE | 56.05 | 14.58 | 0.71 |
| Soraker | SWE | 62.50 | 17.50 | 0.79 |
| Spesshult | SWE | 59.07 | 12.92 | 0.45 |
| Stavsnas | SWE | 59.28 | 18.68 | 0.84 |
| Stockholm | SWE | 59.32 | 18.05 | 0.52 |
| Stocksund | SWE | 59.38 | 18.05 | 0.52 |
| Stora Vika | SWE | 58.93 | 17.78 | 0.89 |
| Storugns | SWE | 57.83 | 18.80 | 0.82 |

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|---|---|---|---|---|
| Straa | SWE | 57.90 | 19.03 | 0.81 |
| Strangnas | SWE | 59.38 | 17.03 | 0.63 |
| Studsvik | SWE | 58.75 | 17.28 | 0.55 |
| Sturko | SWE | 56.08 | 15.67 | 0.71 |
| Sundsvall | SWE | 62.42 | 17.33 | 0.86 |
| Taxinge | SWE | 59.22 | 17.37 | 0.57 |
| Torko | SWE | 56.15 | 15.40 | 0.71 |
| Trelleborg | SWE | 55.37 | 13.15 | 0.64 |
| Umea | SWE | 63.70 | 20.35 | 1.04 |
| Uppsala | SWE | 59.87 | 17.65 | 0.43 |
| Valdemarsvik | SWE | 58.20 | 16.60 | 0.55 |
| Vaxholm | SWE | 59.38 | 18.33 | 0.54 |
| Vesteras | SWE | 59.60 | 16.43 | 0.58 |
| Vestervik | SWE | 57.75 | 16.65 | 0.92 |
| Visby | SWE | 57.65 | 18.28 | 0.71 |
| Ystad | SWE | 55.43 | 13.83 | 0.65 |
| Berdiansk | UKR | 46.75 | 36.78 | 1.02 |
| Cherkassy | UKR | 49.43 | 32.05 | 0.27 |
| Dneprodzerzhinsk | UKR | 48.50 | 34.62 | 0.46 |
| Dnepropetrovsk | UKR | 48.48 | 35.00 | 0.51 |
| Kiev | UKR | 50.42 | 30.50 | 0.20 |
| Kremenchug | UKR | 49.05 | 33.42 | 0.34 |
| Mariupol | UKR | 47.05 | 37.50 | 0.96 |
| Reni | UKR | 45.43 | 28.30 | 0.75 |
| Tyaginka | UKR | 46.75 | 33.05 | 0.58 |
| Zaporozhye | UKR | 47.83 | 35.17 | 0.63 |
| Albany | USA | 42.65 | -73.75 | 0.56 |
| Allyns Point | USA | 41.43 | -72.07 | 0.73 |
| Alpena | USA | 45.05 | -83.43 | 0.15 |
| Alsen | USA | 42.18 | -73.92 | 0.50 |
| Ashland | USA | 46.58 | -90.90 | 0.23 |
| Ashtabula | USA | 41.92 | -80.82 | 0.53 |
| Bangor | USA | 44.80 | -68.78 | 0.25 |
| Bath | USA | 43.90 | -69.82 | 0.53 |
| Bay City | USA | 43.58 | -83.88 | 0.44 |
| Bayfield | USA | 46.80 | -90.80 | 0.34 |
| Belfast | USA | 44.42 | -69.00 | 0.77 |
| Benton Harbour | USA | 42.12 | -86.45 | 0.30 |
| Beverly | USA | 46.82 | -119.92 | 0.77 |
| Brevort | USA | 46.00 | -85.03 | 0.20 |
| Buchanan | USA | 41.20 | -73.92 | 0.84 |
| Bucksport | USA | 44.57 | -68.80 | 0.51 |
| Buffalo | USA | 42.88 | -78.88 | 0.51 |
| Buffington | USA | 41.63 | -87.42 | 0.39 |
| Burlington (NJ) | USA | 40.08 | -74.85 | 1.05 |

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|---|---|---|---|---|
| Burns Harbour | USA | 41.63 | -87.18 | 0.38 |
| Calcite | USA | 45.40 | -83.78 | 0.24 |
| Camden (NJ) | USA | 39.93 | -75.13 | 1.08 |
| Catskill | USA | 42.22 | -73.88 | 0.50 |
| Cedarville | USA | 45.98 | -84.35 | 0.36 |
| Cementon | USA | 42.13 | -73.92 | 0.54 |
| Charlevoix | USA | 45.32 | -85.22 | 0.10 |
| Cheboygan | USA | 45.67 | -84.47 | 0.21 |
| Chester (PA) | USA | 39.83 | -75.37 | 1.09 |
| Chicago | USA | 41.83 | -87.63 | 0.34 |
| Claymont | USA | 39.80 | -75.43 | 1.09 |
| Clayton | USA | 44.23 | -76.08 | 0.40 |
| Cleveland | USA | 41.52 | -81.72 | 0.60 |
| Conneaut | USA | 41.97 | -80.57 | 0.52 |
| Coxsackie | USA | 42.33 | -73.80 | 0.51 |
| Delair | USA | 40.00 | -75.03 | 1.08 |
| Delaware City | USA | 39.57 | -75.58 | 1.10 |
| Detour | USA | 45.97 | -83.88 | 0.37 |
| Detroit | USA | 42.33 | -83.03 | 0.44 |
| Duluth | USA | 46.73 | -92.15 | 0.41 |
| Eddystone | USA | 39.83 | -75.33 | 1.09 |
| Erie | USA | 42.17 | -80.08 | 0.51 |
| Escanaba | USA | 45.78 | -87.07 | 0.13 |
| Essexville | USA | 43.60 | -83.83 | 0.44 |
| Fairless Hills | USA | 40.17 | -74.88 | 1.05 |
| Fairport | USA | 41.77 | -81.32 | 0.58 |
| Ferrysburg | USA | 43.08 | -86.23 | 0.15 |
| Gary Harbour | USA | 41.60 | -87.35 | 0.37 |
| Gloucester (NJ) | USA | 39.88 | -75.13 | 1.08 |
| Grand Haven | USA | 43.07 | -86.25 | 0.16 |
| Grand River | USA | 41.73 | -81.28 | 0.57 |
| Green Bay | USA | 44.52 | -88.00 | 0.32 |
| Groton | USA | 41.35 | -72.08 | 1.03 |
| Harbor Beach | USA | 43.83 | -82.65 | 0.12 |
| Holland (MI) | USA | 42.78 | -86.22 | 0.19 |
| Huron | USA | 41.40 | -82.58 | 0.66 |
| Hyde Park | USA | 41.78 | -73.93 | 0.54 |
| Indiana Harbour | USA | 41.67 | -87.50 | 0.39 |
| Kalama | USA | 46.02 | -122.83 | 0.69 |
| Kenosha | USA | 42.58 | -87.82 | 0.16 |
| Kewaunee | USA | 44.45 | -87.52 | 0.23 |
| Kingston | USA | 41.87 | -73.97 | 0.54 |
| Lafayette | USA | 40.40 | -86.88 | 0.83 |
| Lorain | USA | 41.47 | -82.17 | 0.64 |
| Ludington | USA | 43.97 | -86.45 | 0.24 |

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|---|---|---|---|---|
| Mackinaw City | USA | 45.75 | -84.73 | 0.19 |
| Manistee | USA | 44.25 | -86.33 | 0.26 |
| Manitowoc | USA | 44.10 | -87.63 | 0.20 |
| Marblehead | USA | 41.53 | -82.72 | 0.74 |
| Marcus Hook | USA | 39.82 | -75.42 | 1.09 |
| Marine City | USA | 42.72 | -82.48 | 0.25 |
| Marinette | USA | 45.12 | -87.62 | 0.15 |
| Marquette | USA | 46.60 | -87.38 | 0.45 |
| Marysville | USA | 42.92 | -82.48 | 0.24 |
| Menominee | USA | 45.13 | -87.62 | 0.14 |
| Milton | USA | 41.60 | -73.95 | 0.66 |
| Milwaukee | USA | 43.05 | -87.87 | 0.09 |
| Monroe | USA | 41.92 | -83.33 | 0.69 |
| Mossville | USA | 40.80 | -89.57 | 0.89 |
| Muskegon | USA | 43.18 | -86.23 | 0.13 |
| New London | USA | 41.40 | -72.10 | 0.84 |
| Newburgh | USA | 41.50 | -74.08 | 0.66 |
| Ogdensburg | USA | 44.70 | -75.50 | 0.34 |
| Olympia | USA | 47.05 | -122.90 | 0.73 |
| Ontonagon | USA | 46.87 | -89.30 | 0.37 |
| Oswego | USA | 43.47 | -76.53 | 0.39 |
| Pasco | USA | 46.22 | -119.08 | 1.00 |
| Paulsboro | USA | 39.83 | -75.25 | 1.09 |
| Peekskill | USA | 41.25 | -73.92 | 0.83 |
| Pennsauken | USA | 39.97 | -75.03 | 1.08 |
| Peoria | USA | 40.68 | -89.58 | 0.89 |
| Philadelphia | USA | 39.90 | -75.13 | 1.08 |
| Pittsburgh (PA) | USA | 40.43 | -80.00 | 0.70 |
| Point Pleasant | USA | 38.88 | -82.12 | 0.93 |
| Port Dolomite | USA | 45.97 | -84.27 | 0.30 |
| Port Huron | USA | 42.98 | -82.43 | 0.24 |
| Port Inland | USA | 45.97 | -85.87 | 0.23 |
| Port Washington | USA | 43.38 | -87.87 | 0.10 |
| Portland (OR) | USA | 45.57 | -122.73 | 0.72 |
| Poughkeepsie | USA | 41.68 | -73.88 | 0.54 |
| Providence | USA | 41.80 | -71.38 | 0.99 |
| Racine | USA | 42.73 | -87.80 | 0.16 |
| Ravena | USA | 42.47 | -73.80 | 0.53 |
| Reedy Point | USA | 39.57 | -75.57 | 1.10 |
| Rensselaer | USA | 42.65 | -73.73 | 0.56 |
| Rochester (NY) | USA | 43.28 | -77.60 | 0.29 |
| Rockport (MI) | USA | 45.20 | -83.38 | 0.24 |
| Rogers City | USA | 45.40 | -83.83 | 0.25 |
| Roseton | USA | 41.57 | -74.00 | 0.56 |
| Saginaw | USA | 43.45 | -83.92 | 0.47 |

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|---|---|---|---|---|
| Salem (NJ) | USA | 39.57 | -75.47 | 1.10 |
| Sandusky | USA | 41.45 | -82.73 | 0.71 |
| Searsport | USA | 44.45 | -68.92 | 1.02 |
| Sheboygan | USA | 43.75 | -87.70 | 0.25 |
| Shippensburg | USA | 40.03 | -77.52 | 0.77 |
| Silver Bay | USA | 47.28 | -91.27 | 0.87 |
| Somerset (MA) | USA | 41.78 | -71.13 | 0.92 |
| South Brewer | USA | 44.78 | -68.78 | 0.25 |
| South Haven | USA | 42.45 | -86.25 | 0.23 |
| St. Clair | USA | 42.82 | -82.47 | 0.25 |
| St. Joseph | USA | 42.08 | -86.50 | 0.33 |
| Stoneport | USA | 45.28 | -83.43 | 0.25 |
| Stony Point | USA | 41.23 | -73.97 | 0.83 |
| Superior | USA | 46.72 | -92.08 | 0.41 |
| Taconite Harbour | USA | 47.50 | -90.92 | 0.84 |
| The Dalles | USA | 45.58 | -121.18 | 0.46 |
| Toledo | USA | 41.70 | -83.47 | 0.72 |
| Tomkins Cove | USA | 41.27 | -73.98 | 0.83 |
| Tonawanda | USA | 43.02 | -78.88 | 0.51 |
| Trenton | USA | 40.18 | -74.75 | 1.01 |
| Troutdale | USA | 45.53 | -122.38 | 0.73 |
| Troy | USA | 42.73 | -73.68 | 0.55 |
| Tullytown | USA | 40.13 | -74.82 | 1.00 |
| Two Harbors | USA | 47.02 | -91.67 | 0.73 |
| Umatilla | USA | 45.92 | -119.33 | 0.87 |
| Vancouver | USA | 45.63 | -122.67 | 0.72 |
| Waddington | USA | 44.85 | -75.20 | 0.31 |
| Waukegan | USA | 42.37 | -87.83 | 0.26 |
| Westville | USA | 39.87 | -75.13 | 1.08 |
| Whitefish Point | USA | 46.75 | -84.95 | 0.48 |
| Willbridge | USA | 45.57 | -122.75 | 0.72 |
| Wilmington (DE) | USA | 39.75 | -75.50 | 1.04 |
| Winterport | USA | 44.63 | -68.85 | 0.45 |
| Wiscasset | USA | 44.00 | -69.67 | 0.54 |
| Wyandotte | USA | 42.18 | -83.15 | 0.59 |
| Yonkers | USA | 40.95 | -73.83 | 0.98 |
| Zilwaukee | USA | 43.47 | -83.92 | 0.46 |

Appendix E. List of global ports that have highest environmental similarity to Duluth-Superior. NIS originating from these ports have the highest potential for survival if introduced at Duluth-Superior.

| Name | Country | Latitude | Longitude | Environmental Distance |
|---|---|---|---|---|
| Eckero | ALD | 60.22 | 19.60 | 0.47 |
| Farjsundet | ALD | 60.23 | 20.02 | 0.65 |
| Finstrom | ALD | 60.25 | 19.92 | 0.64 |
| Lsngnssudd | ALD | 60.12 | 20.30 | 0.67 |
| Mariehamn | ALD | 60.10 | 19.93 | 0.70 |
| Korneuburg | AUT | 48.37 | 16.33 | 0.79 |
| Linz | AUT | 48.32 | 14.30 | 0.57 |
| Vienna | AUT | 48.22 | 16.37 | 0.88 |
| Antwerp | BEL | 51.24 | 4.41 | 0.82 |
| Baasrode | BEL | 51.05 | 4.17 | 0.85 |
| Balen | BEL | 51.17 | 5.17 | 0.80 |
| Boom | BEL | 51.08 | 4.37 | 0.82 |
| Brussels | BEL | 50.83 | 4.32 | 0.81 |
| Buggenhout | BEL | 51.02 | 4.20 | 0.84 |
| Burcht | BEL | 51.20 | 4.33 | 0.83 |
| Chatelineau | BEL | 50.42 | 4.52 | 0.72 |
| Dendermonde | BEL | 51.03 | 4.12 | 0.85 |
| Doel | BEL | 51.32 | 4.27 | 0.85 |
| Engis | BEL | 50.58 | 5.40 | 0.69 |
| Ertvelde | BEL | 51.20 | 3.78 | 0.87 |
| Geel | BEL | 51.15 | 4.97 | 0.80 |
| Genk | BEL | 50.94 | 5.50 | 0.77 |
| Ghent | BEL | 51.09 | 3.75 | 0.86 |
| Grimbergen | BEL | 50.93 | 4.37 | 0.81 |
| Grobbendonk | BEL | 51.20 | 4.75 | 0.79 |
| Haren | BEL | 50.90 | 4.38 | 0.81 |
| Hemiksem | BEL | 51.15 | 4.34 | 0.82 |
| Hermalle sous Huy | BEL | 50.55 | 5.37 | 0.69 |
| Hingene | BEL | 51.12 | 4.27 | 0.84 |
| Hoboken | BEL | 51.17 | 4.33 | 0.84 |
| Humbeek | BEL | 50.97 | 4.38 | 0.81 |
| Kallo | BEL | 51.25 | 4.28 | 0.83 |
| Kapelle op den Bos | BEL | 51.02 | 4.37 | 0.82 |
| Kruibeke | BEL | 51.17 | 4.32 | 0.84 |
| Kwaadmechelen | BEL | 51.10 | 5.15 | 0.80 |
| Lanaken | BEL | 50.88 | 5.65 | 0.77 |
| Langerbrugge | BEL | 51.12 | 3.75 | 0.86 |
| Liefkenshoek | BEL | 51.30 | 4.28 | 0.85 |
| Liege | BEL | 50.64 | 5.57 | 0.71 |
| Lillo | BEL | 51.30 | 4.30 | 0.85 |
| Lixhe | BEL | 50.73 | 5.70 | 0.73 |

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|---|---|---|---|---|
| Maasmechelen | BEL | 50.97 | 5.70 | 0.76 |
| Marly | BEL | 50.88 | 4.38 | 0.81 |
| Mechelen | BEL | 51.03 | 4.47 | 0.82 |
| Melle | BEL | 51.00 | 3.80 | 0.83 |
| Merksem | BEL | 51.23 | 4.48 | 0.82 |
| Nameche | BEL | 50.47 | 4.98 | 0.70 |
| Niel | BEL | 51.12 | 4.33 | 0.84 |
| Olen | BEL | 51.15 | 4.87 | 0.80 |
| Puurs | BEL | 51.07 | 4.27 | 0.84 |
| Rieme | BEL | 51.17 | 3.77 | 0.87 |
| Ruisbroek | BEL | 50.78 | 4.28 | 0.81 |
| Rumst | BEL | 51.07 | 4.42 | 0.82 |
| Rupelmonde | BEL | 51.13 | 4.28 | 0.84 |
| Schelle | BEL | 51.13 | 4.32 | 0.84 |
| Schoten | BEL | 51.25 | 4.50 | 0.82 |
| Seilles | BEL | 50.50 | 5.08 | 0.63 |
| Sint-Kruis-Winkel | BEL | 51.15 | 3.80 | 0.87 |
| Temse | BEL | 51.13 | 4.22 | 0.84 |
| Terdonk | BEL | 51.15 | 3.78 | 0.87 |
| Terhagen | BEL | 51.08 | 4.38 | 0.82 |
| Tessenderlo | BEL | 51.07 | 5.08 | 0.80 |
| Tielrode | BEL | 51.12 | 4.22 | 0.84 |
| Tisselt | BEL | 51.03 | 4.37 | 0.82 |
| Val St. Lambert | BEL | 50.57 | 5.47 | 0.69 |
| Verbrande Brug | BEL | 50.95 | 4.38 | 0.81 |
| Vilvoorde | BEL | 50.95 | 4.42 | 0.81 |
| Willebroek | BEL | 51.05 | 4.35 | 0.82 |
| Wintham | BEL | 51.10 | 4.28 | 0.84 |
| Wondelgem | BEL | 51.08 | 3.72 | 0.86 |
| Zelzate | BEL | 51.20 | 3.80 | 0.87 |
| Zutendaal | BEL | 50.92 | 5.57 | 0.77 |
| Zwyndrecht | BEL | 51.22 | 4.33 | 0.83 |
| Amherstburg | CAN | 42.10 | -83.08 | 1.03 |
| Baddeck | CAN | 46.10 | -60.73 | 0.76 |
| Bath | CAN | 44.17 | -76.77 | 0.68 |
| Batiscan | CAN | 46.52 | -72.23 | 0.42 |
| Bayside | CAN | 45.17 | -67.13 | 0.80 |
| Becancour | CAN | 46.40 | -72.38 | 0.47 |
| Bella Coola | CAN | 52.38 | -126.77 | 0.64 |
| Belleville | CAN | 44.13 | -77.37 | 0.59 |
| Bowmanville | CAN | 43.90 | -78.67 | 0.45 |
| Boylston | CAN | 45.45 | -61.52 | 0.93 |
| Britt | CAN | 45.77 | -80.58 | 0.23 |
| Brockville | CAN | 44.60 | -75.63 | 0.69 |
| Bronte | CAN | 43.40 | -79.70 | 0.49 |

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|---|---|---|---|---|
| Bruce Mines | CAN | 46.27 | -83.72 | 0.10 |
| Burlington | CAN | 43.32 | -79.75 | 0.56 |
| Cardinal | CAN | 44.78 | -75.33 | 0.72 |
| Chicoutimi | CAN | 48.43 | -71.08 | 0.41 |
| Clarenville | CAN | 48.17 | -53.95 | 1.05 |
| Clarkson | CAN | 43.50 | -79.60 | 0.51 |
| Cobourg | CAN | 43.95 | -78.17 | 0.56 |
| Colborne | CAN | 44.00 | -77.88 | 0.56 |
| Collingwood | CAN | 44.50 | -80.23 | 0.44 |
| Contrecoeur | CAN | 45.88 | -73.20 | 0.59 |
| Corner Brook | CAN | 48.95 | -57.93 | 1.01 |
| Cornwall | CAN | 45.02 | -74.72 | 0.70 |
| Corunna | CAN | 42.88 | -82.45 | 0.61 |
| Cote Ste-Catherine | CAN | 45.41 | -73.58 | 0.69 |
| Country Harbour | CAN | 45.22 | -61.73 | 0.94 |
| Courtright | CAN | 42.80 | -82.45 | 0.61 |
| Erieau | CAN | 42.25 | -81.93 | 0.94 |
| Fort Erie | CAN | 42.93 | -78.95 | 0.91 |
| Fredericton | CAN | 45.95 | -66.65 | 0.38 |
| Gananoque | CAN | 44.32 | -76.15 | 0.76 |
| Goderich | CAN | 43.75 | -81.75 | 0.43 |
| Gold River | CAN | 49.68 | -126.12 | 0.74 |
| Goose Bay | CAN | 53.35 | -60.42 | 0.61 |
| Grondines | CAN | 46.75 | -72.03 | 0.34 |
| Hamilton | CAN | 43.23 | -79.85 | 0.50 |
| Hay River | CAN | 60.85 | -115.70 | 0.74 |
| Houston | CAN | 54.40 | -126.65 | 0.59 |
| Humberstone | CAN | 42.90 | -79.25 | 0.87 |
| Iona | CAN | 45.97 | -60.80 | 0.30 |
| Isaac's Harbour | CAN | 45.17 | -61.65 | 1.06 |
| Killarney | CAN | 45.97 | -81.52 | 0.13 |
| Kingston | CAN | 44.20 | -76.50 | 0.74 |
| Kingsville | CAN | 42.02 | -82.72 | 1.06 |
| Kitimat | CAN | 54.00 | -128.70 | 0.33 |
| Lanoraie | CAN | 45.97 | -73.18 | 0.59 |
| Lauzon | CAN | 46.82 | -71.15 | 0.39 |
| Leamington | CAN | 42.05 | -82.62 | 1.07 |
| Levis | CAN | 46.82 | -71.18 | 0.46 |
| Little Current | CAN | 45.97 | -81.92 | 0.43 |
| Little Narrows | CAN | 45.98 | -60.98 | 0.25 |
| Long Sault | CAN | 45.02 | -74.90 | 0.63 |
| Marathon | CAN | 48.75 | -86.38 | 0.55 |
| Meldrum Bay | CAN | 45.92 | -83.10 | 0.09 |
| Michipicoten Harbour | CAN | 47.95 | -84.92 | 0.25 |
| Midland | CAN | 44.75 | -79.93 | 0.39 |

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|---|---|---|---|---|
| Montréal | CAN | 45.50 | -73.55 | 0.72 |
| Mooretown | CAN | 42.85 | -82.47 | 0.61 |
| Morrisburg | CAN | 44.93 | -75.18 | 0.61 |
| Nanticoke | CAN | 42.82 | -80.07 | 0.80 |
| Nelson | CAN | 49.47 | -117.30 | 0.43 |
| Oakville | CAN | 43.43 | -79.67 | 0.47 |
| Ocean Falls | CAN | 52.35 | -127.70 | 0.67 |
| Oshawa | CAN | 43.87 | -78.83 | 0.46 |
| Ottawa | CAN | 45.40 | -75.70 | 0.62 |
| Owen Sound | CAN | 44.58 | -80.95 | 0.35 |
| Parry Sound | CAN | 45.37 | -80.05 | 0.36 |
| Picton | CAN | 44.00 | -77.13 | 0.68 |
| Pointe aux Trembles | CAN | 45.63 | -73.48 | 0.66 |
| Port Alberni | CAN | 49.23 | -125.00 | 0.68 |
| Port Alice | CAN | 50.38 | -127.45 | 0.90 |
| Port Burwell | CAN | 42.63 | -80.80 | 0.79 |
| Port Colborne | CAN | 42.87 | -79.25 | 0.88 |
| Port Credit | CAN | 43.55 | -79.60 | 0.39 |
| Port Dalhousie | CAN | 43.20 | -79.27 | 0.62 |
| Port Dover | CAN | 42.78 | -80.20 | 0.76 |
| Port Hope | CAN | 43.95 | -78.28 | 0.54 |
| Port Maitland | CAN | 42.87 | -79.58 | 0.84 |
| Port McNicoll | CAN | 44.75 | -79.80 | 0.46 |
| Port Stanley | CAN | 42.67 | -81.22 | 0.79 |
| Port Weller | CAN | 43.23 | -79.22 | 0.67 |
| Prescott | CAN | 44.72 | -75.52 | 0.67 |
| Québec | CAN | 46.82 | -71.20 | 0.46 |
| Sarnia | CAN | 42.98 | -82.42 | 0.59 |
| Sault Ste. Marie | CAN | 46.52 | -84.33 | 0.10 |
| Sombra | CAN | 42.70 | -82.47 | 0.61 |
| Sonora | CAN | 45.07 | -61.92 | 0.97 |
| Sorel | CAN | 46.05 | -73.12 | 0.62 |
| Spragge | CAN | 46.22 | -82.67 | 0.24 |
| St. Albans | CAN | 47.87 | -55.85 | 1.08 |
| St. Catharines | CAN | 43.17 | -79.27 | 0.59 |
| St. Romuald | CAN | 46.75 | -71.23 | 0.46 |
| St. Stephen | CAN | 45.20 | -67.28 | 0.53 |
| Ste. Croix | CAN | 46.63 | -71.73 | 0.40 |
| Stewart | CAN | 55.92 | -130.00 | 0.75 |
| Tahsis | CAN | 49.92 | -126.67 | 0.92 |
| Thessalon | CAN | 46.25 | -83.55 | 0.10 |
| Thorold | CAN | 43.08 | -79.17 | 0.85 |
| Three Rivers | CAN | 46.35 | -72.55 | 0.49 |
| Thunder Bay | CAN | 48.42 | -89.22 | 0.41 |
| Tobermory | CAN | 45.23 | -81.65 | 0.10 |

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|---|---|---|---|---|
| Toronto | CAN | 43.63 | -79.38 | 0.41 |
| Tracy | CAN | 46.02 | -73.17 | 0.57 |
| Valleyfield | CAN | 45.22 | -74.08 | 0.68 |
| Wallaceburg | CAN | 42.60 | -82.40 | 0.61 |
| Welland | CAN | 42.97 | -79.22 | 0.81 |
| Weymouth | CAN | 44.45 | -66.02 | 0.73 |
| Wheatley | CAN | 42.08 | -82.43 | 0.95 |
| Whitby | CAN | 43.85 | -78.92 | 0.39 |
| Windsor | CAN | 42.32 | -83.05 | 0.78 |
| Zeballos | CAN | 49.98 | -126.85 | 1.07 |
| Basle | CHE | 47.55 | 7.57 | 0.73 |
| Fujin | CHN | 47.25 | 132.02 | 0.88 |
| Harbin | CHN | 45.73 | 126.60 | 0.97 |
| Heihe | CHN | 50.23 | 127.47 | 0.77 |
| Jiamusi | CHN | 46.80 | 130.35 | 0.87 |
| Panshi | CHN | 42.92 | 126.03 | 0.89 |
| Tongjiang | CHN | 47.63 | 132.50 | 0.88 |
| Chvaletice | CZE | 50.02 | 15.43 | 0.55 |
| Usti nad Labem | CZE | 50.67 | 14.03 | 0.48 |
| Aken | DEU | 51.85 | 12.03 | 0.60 |
| Andernach | DEU | 50.42 | 7.38 | 0.72 |
| Anklam | DEU | 53.87 | 13.68 | 0.76 |
| Aschaffenburg | DEU | 49.95 | 9.17 | 0.66 |
| Barth | DEU | 54.37 | 12.73 | 0.70 |
| Bendorf | DEU | 50.42 | 7.58 | 0.70 |
| Berlin | DEU | 52.53 | 13.42 | 0.63 |
| Berne | DEU | 53.18 | 10.50 | 0.57 |
| Bingen | DEU | 49.95 | 7.90 | 0.74 |
| Bodenwerder | DEU | 51.97 | 9.50 | 0.53 |
| Boizenburg | DEU | 53.38 | 10.73 | 0.57 |
| Bonn | DEU | 50.72 | 7.08 | 0.80 |
| Brandenburg | DEU | 52.40 | 12.52 | 0.61 |
| Braunschweig | DEU | 52.25 | 10.50 | 0.60 |
| Brohl | DEU | 50.42 | 7.30 | 0.61 |
| Burgstaaken | DEU | 54.42 | 11.20 | 1.09 |
| Castrop Rauxel | DEU | 51.55 | 7.30 | 0.74 |
| Cologne | DEU | 50.93 | 7.00 | 0.82 |
| Deggendorf | DEU | 48.83 | 12.97 | 0.57 |
| Dormagen | DEU | 51.10 | 6.95 | 0.82 |
| Dortmund | DEU | 51.53 | 7.45 | 0.73 |
| Duisburg | DEU | 51.43 | 6.75 | 0.80 |
| Dusseldorf | DEU | 51.25 | 6.77 | 0.82 |
| Eisenhuttenstadt | DEU | 52.15 | 14.62 | 0.56 |
| Emmerich | DEU | 51.85 | 6.25 | 0.73 |
| Erftstadt | DEU | 50.80 | 6.75 | 0.74 |

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|---|---|---|---|---|
| Essen | DEU | 51.45 | 7.02 | 0.75 |
| Frankfurt | DEU | 50.12 | 8.67 | 0.70 |
| Geesthacht | DEU | 53.43 | 10.38 | 0.56 |
| Gelsenkirchen | DEU | 51.50 | 7.08 | 0.75 |
| Germersheim | DEU | 49.22 | 8.38 | 0.90 |
| Gernsheim | DEU | 49.75 | 8.47 | 0.80 |
| Greifswald | DEU | 54.10 | 13.38 | 0.73 |
| Gromitz | DEU | 54.15 | 10.98 | 1.06 |
| Haren | DEU | 52.80 | 7.25 | 0.73 |
| Havelberg | DEU | 52.83 | 12.07 | 0.58 |
| Heiligenhafen | DEU | 54.37 | 10.98 | 1.09 |
| Heringsdorf | DEU | 53.97 | 14.17 | 0.81 |
| Hohenhorn | DEU | 53.47 | 10.37 | 0.56 |
| Homberg | DEU | 51.45 | 6.72 | 0.80 |
| Hoya | DEU | 52.80 | 9.13 | 0.60 |
| Ibbenburen | DEU | 52.28 | 7.73 | 0.63 |
| Karlsruhe | DEU | 49.05 | 8.33 | 0.91 |
| Kehl | DEU | 48.58 | 7.83 | 0.84 |
| Koblenz | DEU | 50.33 | 7.58 | 0.63 |
| Krefeld | DEU | 51.33 | 6.57 | 0.80 |
| Kroslin | DEU | 54.13 | 13.75 | 0.67 |
| Ladebow | DEU | 54.10 | 13.45 | 0.73 |
| Lahnstein | DEU | 50.30 | 7.62 | 0.63 |
| Lauenburg | DEU | 53.38 | 10.55 | 0.57 |
| Lauterbach | DEU | 54.33 | 13.52 | 0.66 |
| Leer | DEU | 53.22 | 7.45 | 0.76 |
| Leeseringen | DEU | 52.58 | 9.13 | 0.61 |
| Leverkusen | DEU | 51.02 | 7.03 | 0.73 |
| Lubmin | DEU | 54.12 | 13.60 | 0.73 |
| Ludwigshafen am Rhein | DEU | 49.47 | 8.45 | 0.87 |
| Magdeburg | DEU | 52.13 | 11.62 | 0.57 |
| Mainz | DEU | 50.00 | 8.28 | 0.72 |
| Mannheim | DEU | 49.48 | 8.47 | 0.87 |
| Minden | DEU | 52.30 | 8.90 | 0.61 |
| Monheim | DEU | 51.12 | 6.82 | 0.81 |
| Moselkern | DEU | 50.18 | 7.37 | 0.66 |
| Mukran | DEU | 54.48 | 13.58 | 0.67 |
| Mulheim | DEU | 50.95 | 7.05 | 0.80 |
| Neckarsteinach | DEU | 49.43 | 8.80 | 0.65 |
| Neuss | DEU | 51.20 | 6.70 | 0.82 |
| Neuss/Dusseldorf | DEU | 51.20 | 6.70 | 0.82 |
| Neuwied | DEU | 50.43 | 7.48 | 0.72 |
| Nienburg | DEU | 52.63 | 9.22 | 0.61 |
| Nuremberg | DEU | 49.45 | 11.05 | 0.54 |
| Oldersum | DEU | 53.32 | 7.33 | 1.06 |

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|---|---|---|---|---|
| Orsoy | DEU | 51.53 | 6.68 | 0.78 |
| Orth | DEU | 54.45 | 11.05 | 1.09 |
| Osnabruck | DEU | 52.27 | 8.03 | 0.60 |
| Papenburg | DEU | 53.08 | 7.38 | 0.69 |
| Passau | DEU | 48.58 | 13.47 | 0.51 |
| Peenemunde | DEU | 54.12 | 13.77 | 0.67 |
| Peine | DEU | 52.32 | 10.22 | 0.59 |
| Porz | DEU | 50.88 | 7.05 | 0.80 |
| Regensburg | DEU | 49.02 | 12.12 | 0.48 |
| Remagen | DEU | 50.57 | 7.22 | 0.70 |
| Rheinhausen | DEU | 51.42 | 6.73 | 0.80 |
| Rinteln | DEU | 52.20 | 9.08 | 0.59 |
| Rosslau | DEU | 51.90 | 12.27 | 0.60 |
| Rostock | DEU | 54.15 | 12.10 | 0.77 |
| Ruhrort | DEU | 51.45 | 6.73 | 0.80 |
| Salzgitter | DEU | 52.22 | 10.33 | 0.59 |
| Sassnitz | DEU | 54.52 | 13.63 | 0.67 |
| Speyer | DEU | 49.30 | 8.43 | 0.90 |
| Stralsund | DEU | 54.32 | 13.10 | 0.74 |
| Sturzelberg | DEU | 51.12 | 6.80 | 0.81 |
| Stuttgart | DEU | 48.78 | 9.20 | 0.67 |
| Tangermunde | DEU | 52.57 | 11.97 | 0.58 |
| Ueckermunde | DEU | 53.73 | 14.28 | 0.64 |
| Urdingen | DEU | 51.35 | 6.67 | 0.79 |
| Vallendar | DEU | 50.40 | 7.62 | 0.70 |
| Vierow | DEU | 54.10 | 13.57 | 0.73 |
| Walsum | DEU | 51.53 | 6.68 | 0.78 |
| Warnemunde | DEU | 54.18 | 12.08 | 0.80 |
| Weissenthurm | DEU | 50.42 | 7.48 | 0.72 |
| Wesel | DEU | 51.65 | 6.60 | 0.78 |
| Wesseling | DEU | 50.83 | 7.00 | 0.75 |
| Westerende-Kirchloog | DEU | 53.43 | 7.42 | 1.03 |
| Wolgast | DEU | 54.05 | 13.78 | 0.67 |
| Worms | DEU | 49.63 | 8.35 | 0.84 |
| Wurzburg | DEU | 49.78 | 9.93 | 0.51 |
| Aggersund | DNK | 57.02 | 9.28 | 0.65 |
| Allinge | DNK | 55.28 | 14.80 | 0.70 |
| Fur | DNK | 56.83 | 9.00 | 0.64 |
| Gudhjem | DNK | 55.22 | 14.97 | 0.70 |
| Hammeren | DNK | 55.28 | 14.75 | 0.70 |
| Hammerhavn | DNK | 55.27 | 14.75 | 0.70 |
| Hasle | DNK | 55.18 | 14.70 | 0.70 |
| Hvalpsund | DNK | 56.68 | 9.20 | 0.47 |
| Logstor | DNK | 56.97 | 9.25 | 0.47 |
| Nekso | DNK | 55.07 | 15.15 | 0.66 |

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|---|---|---|---|---|
| Nykobing | DNK | 56.80 | 8.87 | 0.69 |
| Ronne | DNK | 55.10 | 14.70 | 0.70 |
| Skarrehage | DNK | 56.95 | 8.87 | 0.64 |
| Skive | DNK | 56.57 | 9.03 | 0.48 |
| Stege | DNK | 54.98 | 12.28 | 0.70 |
| Struer | DNK | 56.50 | 8.60 | 1.06 |
| Stubbekobing | DNK | 54.88 | 12.03 | 0.55 |
| Svaneke | DNK | 55.13 | 15.15 | 0.66 |
| Tejn | DNK | 55.23 | 14.83 | 0.70 |
| Thisted | DNK | 56.95 | 8.70 | 0.58 |
| Vang | DNK | 55.27 | 14.75 | 0.70 |
| Bekker | EST | 59.45 | 24.67 | 0.43 |
| Dirhami | EST | 59.22 | 23.50 | 0.55 |
| Forby | EST | 59.00 | 23.17 | 0.52 |
| Haapsalu | EST | 58.95 | 23.53 | 0.46 |
| Heltermaa | EST | 58.87 | 23.07 | 0.47 |
| Kuivastu | EST | 58.58 | 23.40 | 0.47 |
| Kunda | EST | 59.52 | 26.55 | 0.48 |
| Lehtma | EST | 59.05 | 22.70 | 0.58 |
| Loksa | EST | 59.58 | 25.72 | 0.49 |
| Meeruse | EST | 59.45 | 24.68 | 0.42 |
| Miiduranna | EST | 59.50 | 24.82 | 0.55 |
| Montu | EST | 57.95 | 22.12 | 0.48 |
| Muuga | EST | 59.50 | 24.97 | 0.55 |
| Narva Joesuu | EST | 59.47 | 28.05 | 0.37 |
| Paldiski | EST | 59.35 | 24.05 | 0.57 |
| Paljassaare | EST | 59.45 | 24.70 | 0.42 |
| Parnu | EST | 58.38 | 24.48 | 0.43 |
| Peetri | EST | 59.45 | 24.73 | 0.42 |
| Prangli Island | EST | 59.63 | 25.00 | 0.50 |
| Rohukula | EST | 58.90 | 23.42 | 0.47 |
| Roomassaare | EST | 58.22 | 22.52 | 0.44 |
| Saaremaa Harbour | EST | 58.53 | 22.23 | 0.48 |
| Sillamae | EST | 59.40 | 27.78 | 0.37 |
| Tallinn | EST | 59.45 | 24.75 | 0.42 |
| Veere | EST | 58.45 | 22.05 | 0.50 |
| Virtsu | EST | 58.58 | 23.55 | 0.44 |
| Dalsbruk | FIN | 60.03 | 22.52 | 0.46 |
| Frojdbole | FIN | 60.15 | 19.92 | 0.70 |
| Galtby | FIN | 60.18 | 21.58 | 0.60 |
| Hamina | FIN | 60.57 | 27.18 | 0.37 |
| Hanko | FIN | 59.82 | 22.97 | 0.59 |
| Helsinki | FIN | 60.17 | 24.95 | 0.41 |
| Houtskar | FIN | 60.22 | 21.37 | 0.62 |
| Imatra | FIN | 61.17 | 28.83 | 0.15 |

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|---|---|---|---|---|
| Inkoo | FIN | 60.05 | 24.02 | 0.46 |
| Isnas | FIN | 60.40 | 26.00 | 0.38 |
| Joensuu | FIN | 62.60 | 29.75 | 0.28 |
| Joutseno | FIN | 61.13 | 28.48 | 0.15 |
| Kalajoki | FIN | 64.25 | 23.93 | 0.92 |
| Kantvik | FIN | 60.08 | 24.38 | 0.45 |
| Kaskinen | FIN | 62.38 | 21.22 | 0.71 |
| Kaukas | FIN | 61.07 | 28.22 | 0.15 |
| Kaukopaa | FIN | 61.25 | 28.87 | 0.18 |
| Kemi | FIN | 65.73 | 24.57 | 0.61 |
| Kokkila | FIN | 60.33 | 22.87 | 0.46 |
| Kokkola | FIN | 63.83 | 23.13 | 0.82 |
| Korpo | FIN | 60.15 | 21.55 | 0.60 |
| Kotka | FIN | 60.47 | 26.95 | 0.45 |
| Koverhar | FIN | 59.88 | 23.22 | 0.59 |
| Kristiinankaupunki | FIN | 62.27 | 21.32 | 0.43 |
| Kronvik | FIN | 63.05 | 21.52 | 0.44 |
| Kuopio | FIN | 62.85 | 27.50 | 0.25 |
| Kustavi | FIN | 60.57 | 21.33 | 0.47 |
| Kuuslahti | FIN | 63.12 | 27.75 | 0.26 |
| Lapaluoto | FIN | 64.67 | 24.42 | 0.53 |
| Lappeenranta | FIN | 61.07 | 28.25 | 0.15 |
| Lappohja | FIN | 59.90 | 23.27 | 0.59 |
| Lappvik | FIN | 59.90 | 23.27 | 0.59 |
| Lauritsala | FIN | 61.08 | 28.33 | 0.15 |
| Loviisa | FIN | 60.45 | 26.23 | 0.37 |
| Luvia | FIN | 61.33 | 21.57 | 0.44 |
| Mantyluoto | FIN | 61.58 | 21.50 | 0.45 |
| Martinniemi | FIN | 65.22 | 25.28 | 0.53 |
| Maxmo | FIN | 63.20 | 22.03 | 0.46 |
| Merikarvia | FIN | 61.85 | 21.47 | 0.46 |
| Mjosund | FIN | 60.22 | 22.47 | 0.45 |
| Mustola | FIN | 61.07 | 28.30 | 0.15 |
| Naantali | FIN | 60.47 | 22.02 | 0.45 |
| Nyhamn | FIN | 62.17 | 21.33 | 0.43 |
| Olkiluoto | FIN | 61.25 | 21.50 | 0.43 |
| Oulu | FIN | 65.00 | 25.47 | 0.50 |
| Parainen | FIN | 60.28 | 22.30 | 0.45 |
| Pateniemi | FIN | 65.08 | 25.40 | 0.52 |
| Perno | FIN | 60.45 | 26.05 | 0.38 |
| Pietarsaari | FIN | 63.68 | 22.70 | 0.79 |
| Pori | FIN | 61.48 | 21.80 | 0.45 |
| Puhos | FIN | 62.10 | 29.92 | 0.25 |
| Raahe | FIN | 64.68 | 24.48 | 0.54 |
| Rahja | FIN | 64.20 | 23.73 | 0.52 |

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|---|---|---|---|---|
| Rauma | FIN | 61.13 | 21.50 | 0.44 |
| Ristiina | FIN | 61.53 | 27.42 | 0.18 |
| Roytta | FIN | 65.77 | 24.15 | 0.60 |
| Salo | FIN | 60.38 | 23.17 | 0.46 |
| Savonlinna | FIN | 61.90 | 28.92 | 0.22 |
| Siilinjarvi | FIN | 63.08 | 27.67 | 0.25 |
| Sipoo | FIN | 60.37 | 25.32 | 0.41 |
| Skogby | FIN | 59.92 | 23.32 | 0.59 |
| Skoldvik | FIN | 60.30 | 25.55 | 0.39 |
| Skuru | FIN | 60.10 | 23.55 | 0.45 |
| Stromma | FIN | 60.18 | 22.90 | 0.46 |
| Summa | FIN | 60.53 | 27.12 | 0.37 |
| Svartback | FIN | 60.28 | 25.53 | 0.39 |
| Taalintehdas | FIN | 60.02 | 22.52 | 0.46 |
| Tammisaari | FIN | 59.98 | 23.43 | 0.45 |
| Teijo | FIN | 60.25 | 22.95 | 0.46 |
| Tolkkinen | FIN | 60.33 | 25.58 | 0.39 |
| Tornio | FIN | 65.85 | 24.15 | 0.60 |
| Tupavuori | FIN | 60.45 | 22.07 | 0.45 |
| Turku | FIN | 60.43 | 22.22 | 0.45 |
| Uusikaupunki | FIN | 60.80 | 21.40 | 0.46 |
| Vaasa | FIN | 63.10 | 21.62 | 0.44 |
| Valkom | FIN | 60.42 | 26.27 | 0.37 |
| Varkaus | FIN | 62.33 | 27.83 | 0.21 |
| Vartsala | FIN | 60.33 | 23.02 | 0.46 |
| Vastanfjard | FIN | 60.05 | 22.65 | 0.46 |
| Veitsiluoto | FIN | 65.70 | 24.62 | 0.61 |
| Abbeville | FRA | 50.10 | 1.85 | 1.05 |
| Annay sous Lens | FRA | 50.47 | 2.87 | 0.83 |
| Bethune | FRA | 50.53 | 2.63 | 0.85 |
| Bonnieres | FRA | 49.03 | 1.58 | 0.92 |
| Chalon-sur-Saone | FRA | 46.78 | 4.83 | 0.97 |
| Conflans | FRA | 48.98 | 2.10 | 0.97 |
| Duclair | FRA | 49.45 | 0.87 | 0.95 |
| Elbeuf | FRA | 49.28 | 1.12 | 0.92 |
| Gaillon | FRA | 49.17 | 1.32 | 0.90 |
| Grand Couronne | FRA | 49.37 | 0.98 | 0.95 |
| Grigny | FRA | 45.62 | 4.78 | 1.07 |
| La Mailleraye | FRA | 49.48 | 0.77 | 0.93 |
| Le Trait | FRA | 49.47 | 0.80 | 0.93 |
| Les Andelys | FRA | 49.25 | 1.43 | 0.89 |
| Lille | FRA | 50.65 | 3.08 | 0.83 |
| Lillebonne | FRA | 49.52 | 0.53 | 0.93 |
| Limay | FRA | 48.97 | 1.78 | 0.91 |
| Lyon | FRA | 45.77 | 4.83 | 1.07 |

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|---|---|---|---|---|
| Mantes | FRA | 48.98 | 1.72 | 0.91 |
| Paris | FRA | 48.87 | 2.33 | 1.04 |
| Petit Couronne | FRA | 49.37 | 1.00 | 0.95 |
| Port Jerome | FRA | 49.47 | 0.53 | 0.98 |
| Radicatel | FRA | 49.42 | 0.48 | 1.01 |
| Rouen | FRA | 49.48 | 1.08 | 0.92 |
| St. Etienne du Rouvray | FRA | 49.37 | 1.12 | 0.92 |
| St. Wandrille | FRA | 49.53 | 0.75 | 0.90 |
| Strasbourg | FRA | 48.57 | 7.70 | 0.84 |
| Vernon | FRA | 49.08 | 1.48 | 0.90 |
| Villeneuve-la-Garenne | FRA | 48.92 | 2.30 | 1.04 |
| Villeneuve-le-Roi | FRA | 48.73 | 2.40 | 1.07 |
| Villequier | FRA | 49.50 | 0.67 | 0.95 |
| Acton Grange | GBR | 53.37 | -2.63 | 0.97 |
| Alloa | GBR | 56.10 | -3.80 | 0.91 |
| Althorpe Wharf | GBR | 53.57 | -0.73 | 0.82 |
| Anderton | GBR | 53.27 | -2.52 | 0.89 |
| Aylesford | GBR | 51.27 | 0.47 | 0.92 |
| Barton | GBR | 53.47 | -2.37 | 0.88 |
| Beckingham | GBR | 53.40 | -0.83 | 0.80 |
| Beverley | GBR | 53.85 | -0.43 | 0.87 |
| Bowling | GBR | 55.93 | -4.50 | 0.84 |
| Burton upon Stather | GBR | 53.65 | -0.68 | 0.84 |
| Coulport | GBR | 56.07 | -4.88 | 0.96 |
| Dalmuir | GBR | 55.90 | -4.43 | 0.78 |
| Dingwall | GBR | 57.60 | -4.42 | 1.09 |
| Drax | GBR | 53.73 | -0.98 | 0.79 |
| Dumbarton | GBR | 55.93 | -4.57 | 0.89 |
| Dunglass | GBR | 55.93 | -4.52 | 0.84 |
| Faslane Dock | GBR | 56.07 | -4.82 | 0.87 |
| Finnart | GBR | 56.12 | -4.83 | 0.87 |
| Flixborough | GBR | 53.62 | -0.68 | 0.82 |
| Frodsham | GBR | 53.30 | -2.73 | 1.06 |
| Gainsborough | GBR | 53.40 | -0.77 | 0.79 |
| Garelochhead | GBR | 56.08 | -4.83 | 0.89 |
| Glasgow | GBR | 55.87 | -4.28 | 0.77 |
| Glenmallan | GBR | 56.12 | -4.82 | 0.85 |
| Gloucester | GBR | 51.87 | -2.22 | 0.92 |
| Goole | GBR | 53.70 | -0.87 | 0.83 |
| Grove Wharf | GBR | 53.60 | -0.68 | 0.82 |
| Gunness | GBR | 53.58 | -0.72 | 0.82 |
| Gunness Wharf | GBR | 53.58 | -0.68 | 0.82 |
| Halling | GBR | 51.37 | 0.01 | 0.92 |
| Howdendyke | GBR | 53.75 | -0.87 | 0.83 |
| Irlam | GBR | 53.43 | -2.42 | 0.90 |

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|---|---|---|---|---|
| Irwell | GBR | 53.47 | -2.35 | 0.88 |
| Keadby | GBR | 53.60 | -0.67 | 0.82 |
| Knottingley | GBR | 53.72 | -1.23 | 0.79 |
| Latchford | GBR | 53.38 | -2.57 | 0.94 |
| London | GBR | 51.50 | -0.07 | 0.95 |
| Manchester | GBR | 53.47 | -2.28 | 0.88 |
| Neap House | GBR | 53.62 | -0.67 | 0.82 |
| Northwich | GBR | 53.27 | -2.53 | 0.89 |
| Old Kilpatrick | GBR | 55.92 | -4.45 | 0.78 |
| Paisley | GBR | 55.85 | -4.43 | 0.77 |
| Partington | GBR | 53.43 | -2.43 | 0.90 |
| Perth | GBR | 56.40 | -3.43 | 0.83 |
| Port Glasgow | GBR | 55.93 | -4.68 | 1.05 |
| Renfrew | GBR | 55.87 | -4.40 | 0.77 |
| Rochester | GBR | 51.40 | 0.50 | 1.06 |
| Rosneath | GBR | 56.02 | -4.80 | 0.97 |
| Selby | GBR | 53.78 | -1.07 | 0.79 |
| Shandon | GBR | 56.05 | -4.82 | 0.87 |
| Snodland | GBR | 51.33 | 0.45 | 0.97 |
| Thorne | GBR | 53.62 | -0.97 | 0.82 |
| Warrington | GBR | 53.40 | -2.60 | 0.94 |
| Winnington | GBR | 53.28 | -2.52 | 0.89 |
| Wisbech | GBR | 52.65 | 0.15 | 1.08 |
| Budapest | HUN | 47.50 | 19.03 | 1.08 |
| Dernish Island | IRL | 52.68 | -8.92 | 1.06 |
| Limerick | IRL | 52.67 | -8.63 | 0.97 |
| Klaipeda | LTU | 55.72 | 21.13 | 0.56 |
| Engure | LVA | 57.17 | 23.23 | 0.45 |
| Labrags | LVA | 56.98 | 21.37 | 0.64 |
| Liepaja | LVA | 56.52 | 21.02 | 0.65 |
| Mersrags | LVA | 57.37 | 23.13 | 0.41 |
| Pavilosta | LVA | 56.90 | 21.18 | 0.62 |
| Riga | LVA | 56.97 | 24.10 | 0.43 |
| Roja | LVA | 57.50 | 22.82 | 0.42 |
| Salacgriva | LVA | 57.75 | 24.37 | 0.42 |
| Skulte | LVA | 57.32 | 24.40 | 0.43 |
| Ventspils | LVA | 57.40 | 21.55 | 0.62 |
| Chisinau | MDA | 47.02 | 28.83 | 0.94 |
| Aalst | NLD | 51.38 | 5.45 | 0.77 |
| Alblasserdam | NLD | 51.87 | 4.62 | 0.71 |
| Ameide | NLD | 51.95 | 4.95 | 0.70 |
| Amsterdam | NLD | 52.37 | 4.90 | 0.99 |
| Arnhem | NLD | 51.97 | 5.88 | 0.72 |
| Assen | NLD | 53.00 | 6.57 | 0.67 |
| Axel Sassing | NLD | 51.28 | 3.87 | 0.94 |

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|---|---|---|---|---|
| Bergambacht | NLD | 51.93 | 4.78 | 0.70 |
| Bergen-op-Zoom | NLD | 51.50 | 4.27 | 0.96 |
| Bergum | NLD | 53.20 | 5.98 | 0.98 |
| Bolnes | NLD | 51.90 | 4.57 | 0.71 |
| Bruinisse | NLD | 51.67 | 4.10 | 0.87 |
| Capelle aan den Yssel | NLD | 51.92 | 4.57 | 0.71 |
| Culemborg | NLD | 51.95 | 5.22 | 0.73 |
| Deest | NLD | 51.88 | 5.67 | 0.73 |
| Den Bommel | NLD | 51.72 | 4.28 | 0.85 |
| Dintelmond | NLD | 51.67 | 4.38 | 0.81 |
| Dinteloord | NLD | 51.63 | 4.37 | 0.82 |
| Dodewaard | NLD | 51.90 | 5.63 | 0.73 |
| Dordrecht | NLD | 51.80 | 4.65 | 0.71 |
| Drachten | NLD | 53.12 | 6.10 | 0.98 |
| Druten | NLD | 51.88 | 5.62 | 0.73 |
| Eindhoven | NLD | 51.43 | 5.50 | 0.77 |
| Fijnaart | NLD | 51.63 | 4.48 | 0.80 |
| Geertruidenberg | NLD | 51.72 | 4.87 | 0.76 |
| Gendt | NLD | 51.87 | 5.98 | 0.72 |
| Gorinchem | NLD | 51.82 | 4.98 | 0.76 |
| Grave | NLD | 51.75 | 5.75 | 0.74 |
| Groot-Ammers | NLD | 51.92 | 4.83 | 0.70 |
| Grouw | NLD | 53.10 | 5.85 | 1.00 |
| Hardinxveld | NLD | 51.82 | 4.85 | 0.70 |
| Heerenveen | NLD | 52.95 | 5.92 | 1.01 |
| Heerewaarden | NLD | 51.82 | 5.38 | 0.74 |
| Heerjansdam | NLD | 51.83 | 4.57 | 0.71 |
| Heijen | NLD | 51.68 | 5.98 | 0.74 |
| Hellevoetsluis | NLD | 51.82 | 4.13 | 0.94 |
| Hendrik Ido Ambacht | NLD | 51.85 | 4.62 | 0.71 |
| Heusden | NLD | 51.73 | 5.15 | 0.75 |
| Huissen | NLD | 51.92 | 5.92 | 0.72 |
| Kinderdijk | NLD | 51.88 | 4.63 | 0.71 |
| Krimpen aan den Yssel | NLD | 51.90 | 4.58 | 0.71 |
| Lekkerkerk | NLD | 51.92 | 4.63 | 0.71 |
| Lithoyen | NLD | 51.82 | 5.43 | 0.74 |
| Lobith | NLD | 51.87 | 6.13 | 0.73 |
| Maasbracht | NLD | 51.13 | 5.87 | 0.78 |
| Maashees | NLD | 51.57 | 6.03 | 0.76 |
| Maassluis | NLD | 51.92 | 4.25 | 0.76 |
| Maastricht | NLD | 50.85 | 5.68 | 0.76 |
| Made | NLD | 51.68 | 4.80 | 0.77 |
| Middelharnis | NLD | 51.78 | 4.20 | 0.88 |
| Millingen aan den Rijn | NLD | 51.87 | 6.03 | 0.73 |
| Moerdijk | NLD | 51.70 | 4.62 | 0.79 |

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|---|---|---|---|---|
| Nieuw Lekkerland | NLD | 51.88 | 4.63 | 0.71 |
| Nieuwerkerk aan den Yssel | NLD | 51.97 | 4.58 | 0.71 |
| Nijmegen | NLD | 51.83 | 5.83 | 0.74 |
| Numansdorp | NLD | 51.72 | 4.42 | 0.83 |
| Ooltgensplaat | NLD | 51.68 | 4.33 | 0.82 |
| Oosterhout | NLD | 51.62 | 4.87 | 0.76 |
| Oss | NLD | 51.77 | 5.52 | 0.74 |
| Ouderkerk | NLD | 51.93 | 4.60 | 0.71 |
| Oudewater | NLD | 52.03 | 4.88 | 1.04 |
| Ouwerkerk | NLD | 51.63 | 3.98 | 0.96 |
| Overschie | NLD | 51.93 | 4.42 | 0.72 |
| Paal | NLD | 51.35 | 4.12 | 0.97 |
| Papendrecht | NLD | 51.83 | 4.63 | 0.71 |
| Raamsdonksveer | NLD | 51.70 | 4.92 | 0.76 |
| Renkum | NLD | 51.97 | 5.73 | 0.72 |
| Rhenen | NLD | 51.95 | 5.57 | 0.73 |
| Ridderkerk | NLD | 51.87 | 4.58 | 0.71 |
| Rijswijk | NLD | 51.78 | 5.02 | 0.75 |
| Roermond | NLD | 51.20 | 5.98 | 0.78 |
| Rotterdam | NLD | 51.90 | 4.48 | 0.72 |
| Sas van Ghent | NLD | 51.23 | 3.80 | 0.89 |
| Schiedam | NLD | 51.90 | 4.40 | 0.73 |
| 'sGravendeel | NLD | 51.77 | 4.60 | 0.71 |
| 'sHertogenbosch | NLD | 51.70 | 5.30 | 0.77 |
| Sliedrecht | NLD | 51.83 | 4.75 | 0.70 |
| Slikkerveer | NLD | 51.88 | 4.60 | 0.71 |
| Sluiskil | NLD | 51.30 | 3.83 | 0.95 |
| Spijk | NLD | 51.87 | 5.05 | 0.73 |
| St. Annaland | NLD | 51.62 | 4.10 | 0.78 |
| Stavenisse | NLD | 51.58 | 4.00 | 0.96 |
| Stein | NLD | 50.97 | 5.77 | 0.76 |
| Swalmen | NLD | 51.22 | 6.02 | 0.78 |
| Tegelen | NLD | 51.35 | 6.13 | 0.78 |
| Tiel | NLD | 51.88 | 5.45 | 0.73 |
| Tilburg | NLD | 51.55 | 5.07 | 0.76 |
| Venlo | NLD | 51.37 | 6.17 | 0.78 |
| Vlaardingen | NLD | 51.90 | 4.35 | 0.73 |
| Waalwijk | NLD | 51.70 | 5.07 | 0.75 |
| Wageningen | NLD | 51.97 | 5.67 | 0.73 |
| Wanssum | NLD | 51.53 | 6.08 | 0.76 |
| Wartena | NLD | 53.15 | 5.90 | 0.84 |
| Werkendam | NLD | 51.80 | 4.90 | 0.70 |
| Willemstad | NLD | 51.68 | 4.40 | 0.81 |
| Wolphaartsdijk | NLD | 51.53 | 3.82 | 1.02 |
| Zaltbommel | NLD | 51.80 | 5.20 | 0.75 |

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|---|---|---|---|---|
| Zierikzee | NLD | 51.63 | 3.88 | 1.03 |
| Zuilichem | NLD | 51.80 | 5.12 | 0.75 |
| Zwijndrecht | NLD | 51.82 | 4.65 | 0.71 |
| Aagotnes | NOR | 60.40 | 5.02 | 1.08 |
| Aakra | NOR | 59.78 | 6.10 | 0.74 |
| Aalvik | NOR | 60.43 | 6.40 | 0.92 |
| Aandalsnes | NOR | 62.57 | 7.68 | 1.03 |
| Alta | NOR | 69.97 | 23.25 | 0.91 |
| Anfiskaa | NOR | 66.28 | 14.10 | 1.04 |
| Askoy | NOR | 60.40 | 5.17 | 0.94 |
| Balholm | NOR | 61.22 | 6.53 | 0.76 |
| Bergen | NOR | 60.40 | 5.32 | 0.89 |
| Buvika | NOR | 63.32 | 10.18 | 1.01 |
| Bygstad | NOR | 61.38 | 5.67 | 0.93 |
| Dirdal | NOR | 58.78 | 6.23 | 0.90 |
| Dolvik | NOR | 60.32 | 5.25 | 0.93 |
| Eide | NOR | 60.52 | 6.72 | 0.94 |
| Eidfjord | NOR | 60.47 | 7.07 | 1.09 |
| Eikefet | NOR | 60.70 | 5.55 | 0.84 |
| Eikefjord | NOR | 61.60 | 5.47 | 1.07 |
| Eitrheimsneset | NOR | 60.10 | 6.53 | 1.06 |
| Elvebakken | NOR | 69.92 | 23.42 | 0.95 |
| Etne | NOR | 59.67 | 5.95 | 0.74 |
| Fiborgtangen | NOR | 63.72 | 11.17 | 0.60 |
| Finneid | NOR | 67.25 | 15.40 | 0.89 |
| Finnsnes | NOR | 69.23 | 17.97 | 1.10 |
| Flekkefjord | NOR | 58.30 | 6.67 | 1.01 |
| Florvaag | NOR | 60.45 | 5.22 | 0.84 |
| Follafoss | NOR | 63.98 | 11.10 | 0.71 |
| Forde (Fordefjord) | NOR | 61.45 | 5.85 | 0.89 |
| Forde (Fuglesetfjord) | NOR | 61.03 | 5.82 | 0.85 |
| Fusa | NOR | 60.20 | 5.62 | 0.82 |
| Garnes | NOR | 60.43 | 5.48 | 0.74 |
| Gaupne | NOR | 61.42 | 7.30 | 0.82 |
| Glaerem | NOR | 63.02 | 8.52 | 0.89 |
| Gullsmedvik | NOR | 66.33 | 14.15 | 1.04 |
| Haugsvik | NOR | 61.83 | 5.00 | 1.09 |
| Hellesylt | NOR | 62.08 | 6.88 | 1.10 |
| Heroysund | NOR | 59.92 | 5.78 | 0.74 |
| Herre | NOR | 59.10 | 9.53 | 0.66 |
| Hjelmaas | NOR | 60.58 | 5.35 | 1.10 |
| Hommelvik | NOR | 63.42 | 10.80 | 0.69 |
| Hoyanger | NOR | 61.22 | 6.07 | 1.07 |
| Hoylandsbygdi | NOR | 59.77 | 5.78 | 0.71 |
| Hoylandssundet | NOR | 59.78 | 5.80 | 0.69 |

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|---|---|---|---|---|
| Husnes | NOR | 59.87 | 5.77 | 0.74 |
| Kaupanger | NOR | 61.18 | 7.23 | 0.73 |
| Knarrevik | NOR | 60.37 | 5.17 | 0.94 |
| Kongsmoen | NOR | 64.88 | 12.43 | 0.92 |
| Kvinesdal | NOR | 58.30 | 7.00 | 0.82 |
| Laksevaag | NOR | 60.38 | 5.30 | 0.89 |
| Langangen | NOR | 59.08 | 9.80 | 0.88 |
| Langstein | NOR | 63.55 | 10.92 | 0.93 |
| Levanger | NOR | 63.75 | 11.30 | 0.61 |
| Lofallstrand | NOR | 60.02 | 6.00 | 0.54 |
| Malm | NOR | 64.07 | 11.22 | 0.68 |
| Malvik | NOR | 63.42 | 10.63 | 0.68 |
| Menstad | NOR | 59.17 | 9.65 | 0.58 |
| Mo i Rana | NOR | 66.32 | 14.13 | 1.04 |
| Mosjoen | NOR | 65.83 | 13.18 | 1.04 |
| Muruvik | NOR | 63.43 | 10.85 | 0.67 |
| Namsos | NOR | 64.47 | 11.50 | 1.10 |
| Narvik | NOR | 68.43 | 17.43 | 1.01 |
| Naustdal | NOR | 61.52 | 5.72 | 1.04 |
| Nordfjordeid | NOR | 61.90 | 6.02 | 0.97 |
| Nordveitgrend | NOR | 60.10 | 5.73 | 0.76 |
| Norheimsund | NOR | 60.37 | 6.15 | 0.96 |
| Nystrand | NOR | 59.10 | 9.72 | 0.96 |
| Odda | NOR | 60.07 | 6.55 | 1.06 |
| Olen | NOR | 59.60 | 5.83 | 0.69 |
| Omastrand | NOR | 60.22 | 5.97 | 0.73 |
| Onarheim | NOR | 59.95 | 5.65 | 0.81 |
| Orkanger | NOR | 63.32 | 9.85 | 0.86 |
| Oystese | NOR | 60.38 | 6.22 | 0.84 |
| Porsgrunn | NOR | 59.13 | 9.65 | 0.65 |
| Raudsand | NOR | 62.83 | 8.10 | 0.98 |
| Rognan | NOR | 67.08 | 15.37 | 0.96 |
| Ronningen | NOR | 63.70 | 10.58 | 0.81 |
| Rosendal | NOR | 59.98 | 6.02 | 0.99 |
| Rubbestadneset | NOR | 59.82 | 5.28 | 0.94 |
| Sagvaag | NOR | 59.77 | 5.38 | 1.07 |
| Salsbruket | NOR | 64.80 | 11.88 | 0.96 |
| Sandane | NOR | 61.77 | 6.22 | 1.06 |
| Sandnes | NOR | 58.85 | 5.75 | 1.06 |
| Sauda | NOR | 59.65 | 6.35 | 0.90 |
| Skaalevik | NOR | 60.37 | 5.22 | 0.93 |
| Skaanevik | NOR | 59.75 | 5.93 | 0.73 |
| Skien | NOR | 59.20 | 9.62 | 0.62 |
| Sogndal | NOR | 61.23 | 7.10 | 0.74 |
| Steinkjer | NOR | 64.02 | 11.50 | 0.65 |

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| Stjordal | NOR | 63.45 | 10.88 | 0.67 |
| Stryn | NOR | 61.92 | 6.73 | 1.01 |
| Sunndalsora | NOR | 62.68 | 8.60 | 1.10 |
| Thamshavn | NOR | 63.33 | 9.87 | 0.86 |
| Trondheim | NOR | 63.43 | 10.40 | 0.68 |
| Trosvik | NOR | 59.05 | 9.70 | 1.07 |
| Tyssebotn | NOR | 60.62 | 5.58 | 0.73 |
| Tyssedal | NOR | 60.12 | 6.57 | 1.06 |
| Ulvik | NOR | 60.57 | 6.92 | 0.91 |
| Uskedal | NOR | 59.93 | 5.88 | 0.82 |
| Vadheim | NOR | 61.20 | 5.82 | 0.89 |
| Vaksdal | NOR | 60.48 | 5.75 | 0.73 |
| Verdal | NOR | 63.78 | 11.43 | 0.62 |
| Vik (Sognefjord) | NOR | 61.08 | 6.58 | 0.85 |
| Darlowo | POL | 54.43 | 16.38 | 0.72 |
| Elblag | POL | 54.17 | 19.40 | 0.66 |
| Frombork | POL | 54.35 | 19.67 | 0.66 |
| Gdansk | POL | 54.35 | 18.65 | 0.59 |
| Gdynia | POL | 54.53 | 18.55 | 0.64 |
| Kolobrzeg | POL | 54.18 | 15.57 | 0.84 |
| Kozle | POL | 50.32 | 18.13 | 0.48 |
| Niechorze | POL | 54.10 | 15.07 | 0.78 |
| Nowa Sol | POL | 51.80 | 15.72 | 0.64 |
| Plock | POL | 52.53 | 19.67 | 0.46 |
| Police | POL | 53.55 | 14.60 | 0.80 |
| Puck | POL | 54.72 | 18.35 | 0.62 |
| Stepnica | POL | 53.65 | 14.63 | 0.80 |
| Swinoujscie | POL | 53.93 | 14.28 | 0.64 |
| Szczecin | POL | 53.42 | 14.55 | 0.78 |
| Tczew | POL | 54.08 | 18.77 | 0.61 |
| Ustka | POL | 54.58 | 16.87 | 0.68 |
| Wladyslawowo | POL | 54.80 | 18.42 | 0.65 |
| Wroclaw | POL | 51.08 | 17.00 | 0.50 |
| Bazias | ROM | 44.80 | 21.40 | 1.06 |
| Orsova | ROM | 44.70 | 22.37 | 0.87 |
| Tulcea | ROM | 45.17 | 28.82 | 1.07 |
| Annenskiy Most | RUS | 60.72 | 37.08 | 0.27 |
| Balakhna | RUS | 56.48 | 43.62 | 0.36 |
| Balakovo | RUS | 52.07 | 47.77 | 0.87 |
| Baltiysk | RUS | 54.65 | 19.90 | 0.62 |
| Belyy Ruchey | RUS | 60.90 | 36.83 | 0.28 |
| Berezniki | RUS | 59.43 | 56.82 | 0.44 |
| Brusnichnoye | RUS | 60.78 | 28.73 | 0.38 |
| Cheboksary | RUS | 56.13 | 47.23 | 0.44 |
| Cherepovets | RUS | 59.15 | 37.83 | 0.21 |

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|---|---|---|---|---|
| Chkalovsk | RUS | 56.75 | 43.23 | 0.35 |
| Dudinka | RUS | 69.40 | 86.17 | 1.02 |
| Gorokhovets | RUS | 56.18 | 42.70 | 0.36 |
| Igarka | RUS | 67.50 | 86.67 | 0.91 |
| Kalach-na-Donu | RUS | 48.72 | 43.48 | 1.06 |
| Kaliningrad | RUS | 54.72 | 20.52 | 0.63 |
| Kamyshin | RUS | 50.08 | 45.40 | 1.02 |
| Kanonerskiy Island | RUS | 59.90 | 30.22 | 0.41 |
| Kazan | RUS | 55.75 | 49.17 | 0.53 |
| Khabarovsk | RUS | 48.50 | 135.17 | 0.79 |
| Khatanga | RUS | 71.97 | 102.42 | 1.10 |
| Kineshma | RUS | 57.45 | 42.12 | 0.30 |
| Kirovsk | RUS | 59.87 | 30.98 | 0.39 |
| Komsomolsk-na-Amure | RUS | 50.53 | 136.98 | 0.61 |
| Kondopoga | RUS | 62.20 | 34.28 | 0.28 |
| Kostroma | RUS | 57.77 | 40.93 | 0.31 |
| Kotlas | RUS | 61.25 | 46.65 | 0.38 |
| Krasnoyarsk | RUS | 56.08 | 92.77 | 0.51 |
| Kronshtadt | RUS | 60.00 | 29.77 | 0.39 |
| Lomonosov | RUS | 59.83 | 29.80 | 0.38 |
| Mago | RUS | 53.25 | 140.22 | 0.61 |
| Medvezhyegorsk | RUS | 62.93 | 34.47 | 0.36 |
| Mondoma | RUS | 59.93 | 37.47 | 0.25 |
| Murmansk | RUS | 68.97 | 33.08 | 0.91 |
| Naberezhnyye Chelny | RUS | 55.68 | 52.30 | 0.52 |
| Nadvoitsy | RUS | 63.93 | 34.33 | 0.44 |
| Naryan Mar | RUS | 67.65 | 53.02 | 0.88 |
| Navashino | RUS | 55.55 | 42.18 | 0.38 |
| Nikolayevsk | RUS | 53.13 | 140.72 | 0.65 |
| Nizhnekamsk | RUS | 55.42 | 51.88 | 0.52 |
| Nizhnetambovskoye | RUS | 50.93 | 138.17 | 0.56 |
| Nizhniy Novgorod | RUS | 56.33 | 44.00 | 0.36 |
| Nizhnyaya Gavan | RUS | 52.40 | 140.43 | 0.58 |
| Novgorod | RUS | 58.50 | 31.33 | 0.14 |
| Novocheboksarsk | RUS | 56.10 | 47.48 | 0.46 |
| Oleniy | RUS | 49.45 | 143.28 | 1.00 |
| Otradnoye | RUS | 59.77 | 30.80 | 0.40 |
| Pechora | RUS | 65.23 | 57.30 | 0.68 |
| Perm | RUS | 58.02 | 56.17 | 0.43 |
| Petrodvorets | RUS | 59.88 | 29.92 | 0.40 |
| Petrozavodsk | RUS | 61.77 | 34.32 | 0.29 |
| Pionerskiy | RUS | 54.93 | 20.20 | 0.61 |
| Podporozhye | RUS | 60.92 | 34.03 | 0.20 |
| Primorsk | RUS | 60.37 | 28.63 | 0.38 |
| Priozersk | RUS | 61.02 | 30.13 | 0.40 |

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|---|---|---|---|---|
| Pudozh | RUS | 61.83 | 36.53 | 0.28 |
| Rybinsk | RUS | 58.02 | 38.87 | 0.24 |
| Samara | RUS | 53.17 | 50.17 | 0.69 |
| Saratov | RUS | 51.50 | 45.92 | 0.93 |
| Segezha | RUS | 63.70 | 34.32 | 0.43 |
| Shlisselburg | RUS | 59.93 | 31.13 | 0.40 |
| Solikamsk | RUS | 59.67 | 56.75 | 0.45 |
| Sosnovka | RUS | 56.23 | 51.28 | 0.50 |
| St. Petersburg | RUS | 59.93 | 30.30 | 0.41 |
| Svetlyy | RUS | 54.63 | 20.15 | 0.64 |
| Syzran | RUS | 53.17 | 48.48 | 0.72 |
| Tolyatti | RUS | 53.53 | 49.40 | 0.65 |
| Tomsk | RUS | 56.50 | 85.08 | 0.59 |
| Ust-Luga | RUS | 59.67 | 28.30 | 0.37 |
| Voznesenye | RUS | 61.02 | 35.47 | 0.22 |
| Vyborg | RUS | 60.72 | 28.73 | 0.38 |
| Vysotsk | RUS | 60.63 | 28.57 | 0.38 |
| Vytegra | RUS | 61.07 | 36.45 | 0.24 |
| Yakutsk | RUS | 62.02 | 129.73 | 0.96 |
| Yaroslavl | RUS | 57.57 | 39.87 | 0.29 |
| Zelenodolsk | RUS | 55.83 | 48.50 | 0.50 |
| Apatin | SCG | 45.67 | 19.00 | 1.04 |
| Bezdam | SCG | 45.83 | 18.93 | 1.05 |
| Mitrovica | SCG | 42.90 | 20.87 | 0.57 |
| Novi Becej | SCG | 45.58 | 20.13 | 1.08 |
| Novi Sad | SCG | 45.27 | 19.83 | 1.05 |
| Bratislava | SVK | 48.15 | 17.12 | 0.82 |
| Komarno | SVK | 47.77 | 18.08 | 0.90 |
| Aelvenaes | SWE | 59.37 | 13.18 | 0.14 |
| Ahus | SWE | 55.93 | 14.32 | 0.74 |
| Amal | SWE | 59.05 | 12.72 | 0.16 |
| Ar | SWE | 57.92 | 18.95 | 0.62 |
| Arvika | SWE | 59.67 | 12.58 | 0.14 |
| Backfors | SWE | 64.50 | 21.42 | 0.85 |
| Balsta | SWE | 59.55 | 17.55 | 0.49 |
| Bergkvara | SWE | 56.38 | 16.08 | 0.68 |
| Borgholm | SWE | 56.88 | 16.65 | 0.64 |
| Bungenas | SWE | 57.82 | 19.08 | 0.61 |
| Burea | SWE | 64.62 | 21.25 | 0.85 |
| Byxelkrok | SWE | 57.30 | 17.03 | 0.55 |
| Dalaro | SWE | 59.13 | 18.42 | 0.59 |
| Degerhamn | SWE | 56.35 | 16.42 | 0.67 |
| Edsvalla | SWE | 59.43 | 13.23 | 0.14 |
| Elleholm | SWE | 56.17 | 14.73 | 0.68 |
| Enkoping | SWE | 59.63 | 17.08 | 0.49 |

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|---|---|---|---|---|
| Farjestaden | SWE | 56.65 | 16.47 | 0.66 |
| Farosund | SWE | 57.87 | 19.07 | 0.61 |
| Fiskeback | SWE | 57.87 | 14.10 | 0.25 |
| Fittja | SWE | 59.23 | 17.85 | 0.54 |
| Forsmark | SWE | 60.42 | 18.20 | 0.61 |
| Furillen | SWE | 57.77 | 19.00 | 0.55 |
| Furusund | SWE | 59.65 | 18.90 | 0.60 |
| Gamleby | SWE | 57.90 | 16.42 | 0.65 |
| Gefle | SWE | 60.67 | 17.17 | 0.46 |
| Grisslehamn | SWE | 60.10 | 18.82 | 0.61 |
| Gruvon | SWE | 59.33 | 13.12 | 0.15 |
| Hallekis | SWE | 58.67 | 13.42 | 0.20 |
| Hallstavik | SWE | 60.05 | 18.60 | 0.60 |
| Haparanda | SWE | 65.83 | 24.13 | 0.60 |
| Haraholmen | SWE | 65.23 | 21.63 | 0.55 |
| Hargshamn | SWE | 60.17 | 18.48 | 0.60 |
| Hasselby | SWE | 59.37 | 17.82 | 0.52 |
| Hernosand | SWE | 62.63 | 17.93 | 0.47 |
| Hoglunda | SWE | 59.42 | 13.25 | 0.14 |
| Hogmarso | SWE | 59.65 | 18.85 | 0.60 |
| Honsater | SWE | 58.63 | 13.45 | 0.20 |
| Hornefors | SWE | 63.62 | 19.90 | 0.49 |
| Hudiksvall | SWE | 61.72 | 17.12 | 0.63 |
| Iggesund | SWE | 61.65 | 17.10 | 0.63 |
| Kagehamn | SWE | 64.83 | 21.03 | 0.54 |
| Kalix | SWE | 65.85 | 23.13 | 0.65 |
| Kallvik | SWE | 57.88 | 16.72 | 0.71 |
| Kallviken | SWE | 64.33 | 21.37 | 0.49 |
| Kalmar | SWE | 56.67 | 16.37 | 0.66 |
| Kalmarsand | SWE | 59.53 | 17.52 | 0.49 |
| Kapellskar | SWE | 59.72 | 19.00 | 0.62 |
| Kappelshamn | SWE | 57.85 | 18.78 | 0.62 |
| Karlshamn | SWE | 56.17 | 14.87 | 0.67 |
| Karlskrona | SWE | 56.17 | 15.60 | 0.66 |
| Karlstad | SWE | 59.38 | 13.52 | 0.14 |
| Klintehamn | SWE | 57.38 | 18.20 | 0.70 |
| Koping | SWE | 59.52 | 16.00 | 0.24 |
| Kopmannebro | SWE | 58.77 | 12.52 | 0.19 |
| Kristinehamn | SWE | 59.32 | 14.12 | 0.15 |
| Krokstad | SWE | 59.10 | 12.92 | 0.15 |
| Kungsor | SWE | 59.43 | 16.10 | 0.22 |
| Kyrkebyn | SWE | 59.27 | 13.07 | 0.15 |
| Landsort | SWE | 58.73 | 17.87 | 0.60 |
| Lidkoping | SWE | 58.50 | 13.17 | 0.22 |
| Liljeholmsviken | SWE | 59.32 | 18.00 | 0.54 |

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|---|---|---|---|---|
| Ljustero | SWE | 59.52 | 18.63 | 0.51 |
| Loudden | SWE | 59.33 | 18.13 | 0.55 |
| Lulea | SWE | 65.58 | 22.17 | 0.58 |
| Mariestad | SWE | 58.72 | 13.83 | 0.19 |
| Marsviken | SWE | 58.67 | 16.95 | 0.51 |
| Mem | SWE | 58.48 | 16.42 | 0.48 |
| Monsteras | SWE | 57.03 | 16.47 | 0.67 |
| Morbylanga | SWE | 56.53 | 16.37 | 0.66 |
| Motala | SWE | 58.53 | 15.07 | 0.18 |
| Munksund | SWE | 65.28 | 21.48 | 0.56 |
| Norrkoping | SWE | 58.60 | 16.20 | 0.48 |
| Norrsundet | SWE | 60.95 | 17.17 | 0.45 |
| Norrtalje | SWE | 59.75 | 18.70 | 0.50 |
| Norsbron | SWE | 59.42 | 13.23 | 0.14 |
| Nykoping | SWE | 58.75 | 17.02 | 0.51 |
| Nynashamn | SWE | 58.90 | 17.95 | 0.60 |
| Oaxen | SWE | 55.97 | 17.72 | 0.64 |
| Orebro | SWE | 59.28 | 15.18 | 0.17 |
| Oregrund | SWE | 60.33 | 18.45 | 0.60 |
| Ornskoldsvik | SWE | 63.27 | 18.72 | 0.49 |
| Oskarshamn | SWE | 57.27 | 16.45 | 0.66 |
| Otterbacken | SWE | 58.95 | 14.05 | 0.18 |
| Oxelosund | SWE | 58.67 | 17.12 | 0.60 |
| Pataholm | SWE | 56.92 | 16.43 | 0.66 |
| Ronehamn | SWE | 57.17 | 18.53 | 0.68 |
| Ronneby | SWE | 56.17 | 15.30 | 0.66 |
| Ronnskar | SWE | 64.67 | 21.28 | 0.85 |
| Rundvik | SWE | 63.53 | 19.45 | 0.52 |
| Saffle | SWE | 59.13 | 12.93 | 0.15 |
| Sandhamn | SWE | 59.28 | 18.90 | 0.60 |
| Sankt Anna | SWE | 58.33 | 16.70 | 0.51 |
| Seskaro Island | SWE | 65.72 | 23.75 | 0.88 |
| Sikea | SWE | 64.13 | 20.98 | 0.85 |
| Simpevarp | SWE | 57.42 | 16.67 | 0.72 |
| Simrishamn | SWE | 55.55 | 14.37 | 0.72 |
| Sjotorp | SWE | 58.83 | 14.00 | 0.19 |
| Skattkar | SWE | 59.42 | 13.70 | 0.14 |
| Skelleftea | SWE | 64.73 | 20.95 | 0.57 |
| Skoghall | SWE | 59.32 | 13.45 | 0.13 |
| Skutskar | SWE | 60.65 | 17.40 | 0.42 |
| Slite | SWE | 57.70 | 18.82 | 0.69 |
| Slottsbron | SWE | 59.33 | 13.10 | 0.15 |
| Soderhamn | SWE | 61.32 | 17.10 | 0.65 |
| Soderkoping | SWE | 58.48 | 16.33 | 0.48 |
| Sodertalje | SWE | 59.20 | 17.63 | 0.58 |

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|---|---|---|---|---|
| Solvesborg | SWE | 56.05 | 14.58 | 0.68 |
| Soraker | SWE | 62.50 | 17.50 | 0.49 |
| Spesshult | SWE | 59.07 | 12.92 | 0.15 |
| Stavsnas | SWE | 59.28 | 18.68 | 0.59 |
| Stockholm | SWE | 59.32 | 18.05 | 0.55 |
| Stocksund | SWE | 59.38 | 18.05 | 0.54 |
| Stora Vika | SWE | 58.93 | 17.78 | 0.60 |
| Storugns | SWE | 57.83 | 18.80 | 0.62 |
| Straa | SWE | 57.90 | 19.03 | 0.61 |
| Strangnas | SWE | 59.38 | 17.03 | 0.50 |
| Studsvik | SWE | 58.75 | 17.28 | 0.52 |
| Sturko | SWE | 56.08 | 15.67 | 0.66 |
| Sundsvall | SWE | 62.42 | 17.33 | 0.53 |
| Taxinge | SWE | 59.22 | 17.37 | 0.51 |
| Torko | SWE | 56.15 | 15.40 | 0.66 |
| Trelleborg | SWE | 55.37 | 13.15 | 0.67 |
| Umea | SWE | 63.70 | 20.35 | 0.68 |
| Uppsala | SWE | 59.87 | 17.65 | 0.12 |
| Valdemarsvik | SWE | 58.20 | 16.60 | 0.49 |
| Vaxholm | SWE | 59.38 | 18.33 | 0.53 |
| Vesteras | SWE | 59.60 | 16.43 | 0.23 |
| Vestervik | SWE | 57.75 | 16.65 | 0.70 |
| Visby | SWE | 57.65 | 18.28 | 0.69 |
| Ystad | SWE | 55.43 | 13.83 | 0.65 |
| Cherkassy | UKR | 49.43 | 32.05 | 0.65 |
| Dneprodzerzhinsk | UKR | 48.50 | 34.62 | 0.85 |
| Dnepropetrovsk | UKR | 48.48 | 35.00 | 0.89 |
| Kiev | UKR | 50.42 | 30.50 | 0.58 |
| Kremenchug | UKR | 49.05 | 33.42 | 0.73 |
| Tyaginka | UKR | 46.75 | 33.05 | 0.97 |
| Zaporozhye | UKR | 47.83 | 35.17 | 1.02 |
| Albany | USA | 42.65 | -73.75 | 0.94 |
| Allyns Point | USA | 41.43 | -72.07 | 1.08 |
| Alpena | USA | 45.05 | -83.43 | 0.32 |
| Alsen | USA | 42.18 | -73.92 | 0.88 |
| Ashland | USA | 46.58 | -90.90 | 0.19 |
| Ashtabula | USA | 41.92 | -80.82 | 0.91 |
| Bangor | USA | 44.80 | -68.78 | 0.58 |
| Bath | USA | 43.90 | -69.82 | 0.82 |
| Bay City | USA | 43.58 | -83.88 | 0.81 |
| Bayfield | USA | 46.80 | -90.80 | 0.08 |
| Belfast | USA | 44.42 | -69.00 | 0.94 |
| Benton Harbour | USA | 42.12 | -86.45 | 0.67 |
| Brevort | USA | 46.00 | -85.03 | 0.23 |
| Bucksport | USA | 44.57 | -68.80 | 0.75 |

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|---|---|---|---|---|
| Buffalo | USA | 42.88 | -78.88 | 0.90 |
| Buffington | USA | 41.63 | -87.42 | 0.76 |
| Burns Harbour | USA | 41.63 | -87.18 | 0.76 |
| Calcite | USA | 45.40 | -83.78 | 0.18 |
| Catskill | USA | 42.22 | -73.88 | 0.88 |
| Cedarville | USA | 45.98 | -84.35 | 0.06 |
| Cementon | USA | 42.13 | -73.92 | 0.93 |
| Charlevoix | USA | 45.32 | -85.22 | 0.40 |
| Cheboygan | USA | 45.67 | -84.47 | 0.21 |
| Chicago | USA | 41.83 | -87.63 | 0.71 |
| Clayton | USA | 44.23 | -76.08 | 0.77 |
| Cleveland | USA | 41.52 | -81.72 | 0.98 |
| Conneaut | USA | 41.97 | -80.57 | 0.91 |
| Coxsackie | USA | 42.33 | -73.80 | 0.90 |
| Detour | USA | 45.97 | -83.88 | 0.07 |
| Detroit | USA | 42.33 | -83.03 | 0.81 |
| Duluth | USA | 46.73 | -92.15 | 0.00 |
| Erie | USA | 42.17 | -80.08 | 0.90 |
| Escanaba | USA | 45.78 | -87.07 | 0.36 |
| Essexville | USA | 43.60 | -83.83 | 0.80 |
| Fairport | USA | 41.77 | -81.32 | 0.96 |
| Ferrysburg | USA | 43.08 | -86.23 | 0.50 |
| Gary Harbour | USA | 41.60 | -87.35 | 0.74 |
| Grand Haven | USA | 43.07 | -86.25 | 0.52 |
| Grand River | USA | 41.73 | -81.28 | 0.95 |
| Green Bay | USA | 44.52 | -88.00 | 0.68 |
| Harbor Beach | USA | 43.83 | -82.65 | 0.38 |
| Holland (MI) | USA | 42.78 | -86.22 | 0.54 |
| Huron | USA | 41.40 | -82.58 | 1.04 |
| Hyde Park | USA | 41.78 | -73.93 | 0.93 |
| Indiana Harbour | USA | 41.67 | -87.50 | 0.76 |
| Kalama | USA | 46.02 | -122.83 | 0.90 |
| Kenosha | USA | 42.58 | -87.82 | 0.51 |
| Kewaunee | USA | 44.45 | -87.52 | 0.18 |
| Kingston | USA | 41.87 | -73.97 | 0.93 |
| Lorain | USA | 41.47 | -82.17 | 1.02 |
| Ludington | USA | 43.97 | -86.45 | 0.29 |
| Mackinaw City | USA | 45.75 | -84.73 | 0.23 |
| Manistee | USA | 44.25 | -86.33 | 0.27 |
| Manitowoc | USA | 44.10 | -87.63 | 0.22 |
| Marine City | USA | 42.72 | -82.48 | 0.61 |
| Marinette | USA | 45.12 | -87.62 | 0.46 |
| Marquette | USA | 46.60 | -87.38 | 0.07 |
| Marysville | USA | 42.92 | -82.48 | 0.60 |
| Menominee | USA | 45.13 | -87.62 | 0.44 |

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|---|---|---|---|---|
| Milton | USA | 41.60 | -73.95 | 1.05 |
| Milwaukee | USA | 43.05 | -87.87 | 0.41 |
| Monroe | USA | 41.92 | -83.33 | 1.07 |
| Muskegon | USA | 43.18 | -86.23 | 0.46 |
| Newburgh | USA | 41.50 | -74.08 | 1.06 |
| Ogdensburg | USA | 44.70 | -75.50 | 0.67 |
| Olympia | USA | 47.05 | -122.90 | 0.93 |
| Ontonagon | USA | 46.87 | -89.30 | 0.04 |
| Oswego | USA | 43.47 | -76.53 | 0.79 |
| Pittsburgh (PA) | USA | 40.43 | -80.00 | 1.09 |
| Port Dolomite | USA | 45.97 | -84.27 | 0.11 |
| Port Huron | USA | 42.98 | -82.43 | 0.60 |
| Port Inland | USA | 45.97 | -85.87 | 0.20 |
| Port Washington | USA | 43.38 | -87.87 | 0.31 |
| Portland (OR) | USA | 45.57 | -122.73 | 1.01 |
| Poughkeepsie | USA | 41.68 | -73.88 | 0.93 |
| Racine | USA | 42.73 | -87.80 | 0.51 |
| Ravena | USA | 42.47 | -73.80 | 0.91 |
| Rensselaer | USA | 42.65 | -73.73 | 0.94 |
| Rochester (NY) | USA | 43.28 | -77.60 | 0.69 |
| Rockport (MI) | USA | 45.20 | -83.38 | 0.18 |
| Rogers City | USA | 45.40 | -83.83 | 0.17 |
| Roseton | USA | 41.57 | -74.00 | 0.96 |
| Saginaw | USA | 43.45 | -83.92 | 0.83 |
| Sandusky | USA | 41.45 | -82.73 | 1.09 |
| Sheboygan | USA | 43.75 | -87.70 | 0.17 |
| Silver Bay | USA | 47.28 | -91.27 | 0.48 |
| South Brewer | USA | 44.78 | -68.78 | 0.58 |
| South Haven | USA | 42.45 | -86.25 | 0.59 |
| St. Clair | USA | 42.82 | -82.47 | 0.61 |
| St. Joseph | USA | 42.08 | -86.50 | 0.70 |
| Stoneport | USA | 45.28 | -83.43 | 0.17 |
| Superior | USA | 46.72 | -92.08 | 0.00 |
| Taconite Harbour | USA | 47.50 | -90.92 | 0.46 |
| The Dalles | USA | 45.58 | -121.18 | 0.82 |
| Toledo | USA | 41.70 | -83.47 | 1.10 |
| Tonawanda | USA | 43.02 | -78.88 | 0.90 |
| Troutdale | USA | 45.53 | -122.38 | 1.02 |
| Troy | USA | 42.73 | -73.68 | 0.93 |
| Two Harbors | USA | 47.02 | -91.67 | 0.34 |
| Vancouver | USA | 45.63 | -122.67 | 1.01 |
| Waddington | USA | 44.85 | -75.20 | 0.61 |
| Waukegan | USA | 42.37 | -87.83 | 0.63 |
| Whitefish Point | USA | 46.75 | -84.95 | 0.09 |
| Willbridge | USA | 45.57 | -122.75 | 1.01 |

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|---|---|---|---|---|
| Winterport | USA | 44.63 | -68.85 | 0.70 |
| Wiscasset | USA | 44.00 | -69.67 | 0.82 |
| Wyandotte | USA | 42.18 | -83.15 | 0.97 |
| Zilwaukee | USA | 43.47 | -83.92 | 0.83 |

Appendix F. List of global ports that have highest environmental similarity to Two Harbours. NIS originating from these ports have the highest potential for survival if introduced at Two Harbours.

| Name | Country | Latitude | Longitude | Environmental Distance |
|---|---|---|---|---|
| Eckero | ALD | 60.22 | 19.60 | 0.47 |
| Farjsundet | ALD | 60.23 | 20.02 | 0.47 |
| Finstrom | ALD | 60.25 | 19.92 | 0.45 |
| Langnasudd | ALD | 60.12 | 20.30 | 0.48 |
| Mariehamn | ALD | 60.10 | 19.93 | 0.48 |
| Korneuburg | AUT | 48.37 | 16.33 | 1.08 |
| Linz | AUT | 48.32 | 14.30 | 0.85 |
| Antwerp | BEL | 51.24 | 4.41 | 1.01 |
| Baasrode | BEL | 51.05 | 4.17 | 1.04 |
| Balen | BEL | 51.17 | 5.17 | 1.00 |
| Boom | BEL | 51.08 | 4.37 | 1.02 |
| Brussels | BEL | 50.83 | 4.32 | 0.99 |
| Buggenhout | BEL | 51.02 | 4.20 | 1.03 |
| Burcht | BEL | 51.20 | 4.33 | 1.01 |
| Chatelineau | BEL | 50.42 | 4.52 | 0.91 |
| Dendermonde | BEL | 51.03 | 4.12 | 1.04 |
| Doel | BEL | 51.32 | 4.27 | 1.03 |
| Engis | BEL | 50.58 | 5.40 | 0.87 |
| Ertvelde | BEL | 51.20 | 3.78 | 1.05 |
| Geel | BEL | 51.15 | 4.97 | 1.00 |
| Genk | BEL | 50.94 | 5.50 | 0.96 |
| Ghent | BEL | 51.09 | 3.75 | 1.05 |
| Grimbergen | BEL | 50.93 | 4.37 | 1.01 |
| Grobbendonk | BEL | 51.20 | 4.75 | 0.98 |
| Haren | BEL | 50.90 | 4.38 | 1.01 |
| Hemiksem | BEL | 51.15 | 4.34 | 1.02 |
| Hermalle sous Huy | BEL | 50.55 | 5.37 | 0.87 |
| Hingene | BEL | 51.12 | 4.27 | 1.03 |
| Hoboken | BEL | 51.17 | 4.33 | 1.03 |
| Humbeek | BEL | 50.97 | 4.38 | 1.01 |
| Kallo | BEL | 51.25 | 4.28 | 1.02 |
| Kapelle op den Bos | BEL | 51.02 | 4.37 | 1.02 |
| Kruibeke | BEL | 51.17 | 4.32 | 1.03 |
| Kwaadmechelen | BEL | 51.10 | 5.15 | 1.00 |
| Lanaken | BEL | 50.88 | 5.65 | 0.96 |
| Langerbrugge | BEL | 51.12 | 3.75 | 1.05 |
| Liefkenshoek | BEL | 51.30 | 4.28 | 1.03 |
| Liege | BEL | 50.64 | 5.57 | 0.89 |
| Lillo | BEL | 51.30 | 4.30 | 1.03 |
| Lixhe | BEL | 50.73 | 5.70 | 0.92 |
| Maasmechelen | BEL | 50.97 | 5.70 | 0.95 |

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|---|---|---|---|---|
| Marly | BEL | 50.88 | 4.38 | 1.01 |
| Mechelen | BEL | 51.03 | 4.47 | 1.02 |
| Melle | BEL | 51.00 | 3.80 | 1.01 |
| Merksem | BEL | 51.23 | 4.48 | 1.01 |
| Nameche | BEL | 50.47 | 4.98 | 0.88 |
| Niel | BEL | 51.12 | 4.33 | 1.03 |
| Olen | BEL | 51.15 | 4.87 | 1.00 |
| Puurs | BEL | 51.07 | 4.27 | 1.03 |
| Rieme | BEL | 51.17 | 3.77 | 1.05 |
| Ruisbroek | BEL | 50.78 | 4.28 | 0.99 |
| Rumst | BEL | 51.07 | 4.42 | 1.02 |
| Rupelmonde | BEL | 51.13 | 4.28 | 1.03 |
| Schelle | BEL | 51.13 | 4.32 | 1.03 |
| Schoten | BEL | 51.25 | 4.50 | 1.01 |
| Seilles | BEL | 50.50 | 5.08 | 0.80 |
| Sint-Kruis-Winkel | BEL | 51.15 | 3.80 | 1.05 |
| Temse | BEL | 51.13 | 4.22 | 1.03 |
| Terdonk | BEL | 51.15 | 3.78 | 1.05 |
| Terhagen | BEL | 51.08 | 4.38 | 1.02 |
| Tessenderlo | BEL | 51.07 | 5.08 | 1.00 |
| Tielrode | BEL | 51.12 | 4.22 | 1.03 |
| Tisselt | BEL | 51.03 | 4.37 | 1.02 |
| Val St. Lambert | BEL | 50.57 | 5.47 | 0.87 |
| Verbrande Brug | BEL | 50.95 | 4.38 | 1.01 |
| Vilvoorde | BEL | 50.95 | 4.42 | 1.01 |
| Willebroek | BEL | 51.05 | 4.35 | 1.02 |
| Wintham | BEL | 51.10 | 4.28 | 1.03 |
| Wondelgem | BEL | 51.08 | 3.72 | 1.05 |
| Zelzate | BEL | 51.20 | 3.80 | 1.05 |
| Zutendaal | BEL | 50.92 | 5.57 | 0.96 |
| Zwyndrecht | BEL | 51.22 | 4.33 | 1.01 |
| Baddeck | CAN | 46.10 | -60.73 | 0.89 |
| Bath | CAN | 44.17 | -76.77 | 1.01 |
| Batiscan | CAN | 46.52 | -72.23 | 0.72 |
| Bayside | CAN | 45.17 | -67.13 | 0.94 |
| Becancour | CAN | 46.40 | -72.38 | 0.78 |
| Bella Coola | CAN | 52.38 | -126.77 | 0.33 |
| Belleville | CAN | 44.13 | -77.37 | 0.93 |
| Bowmanville | CAN | 43.90 | -78.67 | 0.77 |
| Boylston | CAN | 45.45 | -61.52 | 1.05 |
| Britt | CAN | 45.77 | -80.58 | 0.56 |
| Brockville | CAN | 44.60 | -75.63 | 1.03 |
| Bronte | CAN | 43.40 | -79.70 | 0.81 |
| Bruce Mines | CAN | 46.27 | -83.72 | 0.36 |
| Burlington | CAN | 43.32 | -79.75 | 0.88 |

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|---|---|---|---|---|
| Cardinal | CAN | 44.78 | -75.33 | 1.06 |
| Chicoutimi | CAN | 48.43 | -71.08 | 0.65 |
| Clarenville | CAN | 48.17 | -53.95 | 1.04 |
| Clarkson | CAN | 43.50 | -79.60 | 0.82 |
| Cobourg | CAN | 43.95 | -78.17 | 0.89 |
| Colborne | CAN | 44.00 | -77.88 | 0.89 |
| Collingwood | CAN | 44.50 | -80.23 | 0.76 |
| Contrecoeur | CAN | 45.88 | -73.20 | 0.91 |
| Corner Brook | CAN | 48.95 | -57.93 | 1.01 |
| Cornwall | CAN | 45.02 | -74.72 | 1.03 |
| Corunna | CAN | 42.88 | -82.45 | 0.94 |
| Cote Ste-Catherine | CAN | 45.41 | -73.58 | 1.03 |
| Country Harbour | CAN | 45.22 | -61.73 | 1.06 |
| Courtright | CAN | 42.80 | -82.45 | 0.94 |
| Fredericton | CAN | 45.95 | -66.65 | 0.70 |
| Gananoque | CAN | 44.32 | -76.15 | 1.09 |
| Goderich | CAN | 43.75 | -81.75 | 0.75 |
| Gold River | CAN | 49.68 | -126.12 | 0.79 |
| Goose Bay | CAN | 53.35 | -60.42 | 0.42 |
| Grondines | CAN | 46.75 | -72.03 | 0.61 |
| Hamilton | CAN | 43.23 | -79.85 | 0.82 |
| Hay River | CAN | 60.85 | -115.70 | 0.63 |
| Houston | CAN | 54.40 | -126.65 | 0.26 |
| Iona | CAN | 45.97 | -60.80 | 0.54 |
| Killarney | CAN | 45.97 | -81.52 | 0.45 |
| Kingston | CAN | 44.20 | -76.50 | 1.07 |
| Kitimat | CAN | 54.00 | -128.70 | 0.28 |
| Lanoraie | CAN | 45.97 | -73.18 | 0.91 |
| Lauzon | CAN | 46.82 | -71.15 | 0.69 |
| Levis | CAN | 46.82 | -71.18 | 0.77 |
| Little Current | CAN | 45.97 | -81.92 | 0.76 |
| Little Narrows | CAN | 45.98 | -60.98 | 0.53 |
| Long Sault | CAN | 45.02 | -74.90 | 0.96 |
| Marathon | CAN | 48.75 | -86.38 | 0.23 |
| Meldrum Bay | CAN | 45.92 | -83.10 | 0.39 |
| Michipicoten Harbour | CAN | 47.95 | -84.92 | 0.11 |
| Midland | CAN | 44.75 | -79.93 | 0.72 |
| Montréal | CAN | 45.50 | -73.55 | 1.06 |
| Mooretown | CAN | 42.85 | -82.47 | 0.94 |
| Morrisburg | CAN | 44.93 | -75.18 | 0.94 |
| Nelson | CAN | 49.47 | -117.30 | 0.10 |
| Oakville | CAN | 43.43 | -79.67 | 0.79 |
| Ocean Falls | CAN | 52.35 | -127.70 | 0.57 |
| Oshawa | CAN | 43.87 | -78.83 | 0.78 |
| Ottawa | CAN | 45.40 | -75.70 | 0.95 |

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|---|---|---|---|---|
| Owen Sound | CAN | 44.58 | -80.95 | 0.67 |
| Parry Sound | CAN | 45.37 | -80.05 | 0.69 |
| Picton | CAN | 44.00 | -77.13 | 1.01 |
| Pointe aux Trembles | CAN | 45.63 | -73.48 | 0.99 |
| Pointe de la Prairie | CAN | 47.42 | -70.41 | 1.05 |
| Port Alberni | CAN | 49.23 | -125.00 | 0.73 |
| Port Alice | CAN | 50.38 | -127.45 | 0.83 |
| Port Credit | CAN | 43.55 | -79.60 | 0.71 |
| Port Dalhousie | CAN | 43.20 | -79.27 | 0.94 |
| Port Dover | CAN | 42.78 | -80.20 | 1.09 |
| Port Hope | CAN | 43.95 | -78.28 | 0.87 |
| Port McNicoll | CAN | 44.75 | -79.80 | 0.79 |
| Port Weller | CAN | 43.23 | -79.22 | 0.99 |
| Prescott | CAN | 44.72 | -75.52 | 1.00 |
| Québec | CAN | 46.82 | -71.20 | 0.77 |
| Sarnia | CAN | 42.98 | -82.42 | 0.93 |
| Sault Ste. Marie | CAN | 46.52 | -84.33 | 0.42 |
| Sombra | CAN | 42.70 | -82.47 | 0.94 |
| Sonora | CAN | 45.07 | -61.92 | 1.08 |
| Sorel | CAN | 46.05 | -73.12 | 0.94 |
| Spragge | CAN | 46.22 | -82.67 | 0.58 |
| St. Albans | CAN | 47.87 | -55.85 | 1.06 |
| St. Catharines | CAN | 43.17 | -79.27 | 0.92 |
| St. Romuald | CAN | 46.75 | -71.23 | 0.77 |
| St. Stephen | CAN | 45.20 | -67.28 | 0.79 |
| Ste. Croix | CAN | 46.63 | -71.73 | 0.70 |
| Stewart | CAN | 55.92 | -130.00 | 0.42 |
| Tahsis | CAN | 49.92 | -126.67 | 0.87 |
| Thessalon | CAN | 46.25 | -83.55 | 0.38 |
| Three Rivers | CAN | 46.35 | -72.55 | 0.80 |
| Thunder Bay | CAN | 48.42 | -89.22 | 0.11 |
| Tobermory | CAN | 45.23 | -81.65 | 0.41 |
| Toronto | CAN | 43.63 | -79.38 | 0.73 |
| Tracy | CAN | 46.02 | -73.17 | 0.89 |
| Valleyfield | CAN | 45.22 | -74.08 | 1.01 |
| Wallaceburg | CAN | 42.60 | -82.40 | 0.94 |
| Weymouth | CAN | 44.45 | -66.02 | 0.82 |
| Whitby | CAN | 43.85 | -78.92 | 0.71 |
| Zeballos | CAN | 49.98 | -126.85 | 1.05 |
| Basle | CHE | 47.55 | 7.57 | 0.99 |
| Heihe | CHN | 50.23 | 127.47 | 0.98 |
| Chvaletice | CZE | 50.02 | 15.43 | 0.83 |
| Usti nad Labem | CZE | 50.67 | 14.03 | 0.74 |
| Aken | DEU | 51.85 | 12.03 | 0.85 |
| Andernach | DEU | 50.42 | 7.38 | 0.94 |

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|---|---|---|---|---|
| Anklam | DEU | 53.87 | 13.68 | 0.93 |
| Aschaffenburg | DEU | 49.95 | 9.17 | 0.91 |
| Barth | DEU | 54.37 | 12.73 | 0.82 |
| Bendorf | DEU | 50.42 | 7.58 | 0.92 |
| Berlin | DEU | 52.53 | 13.42 | 0.89 |
| Berne | DEU | 53.18 | 10.50 | 0.75 |
| Bingen | DEU | 49.95 | 7.90 | 0.99 |
| Bodenwerder | DEU | 51.97 | 9.50 | 0.70 |
| Boizenburg | DEU | 53.38 | 10.73 | 0.75 |
| Bonn | DEU | 50.72 | 7.08 | 1.02 |
| Brandenburg | DEU | 52.40 | 12.52 | 0.86 |
| Braunschweig | DEU | 52.25 | 10.50 | 0.80 |
| Brohl | DEU | 50.42 | 7.30 | 0.81 |
| Castrop Rauxel | DEU | 51.55 | 7.30 | 0.93 |
| Cologne | DEU | 50.93 | 7.00 | 1.04 |
| Deggendorf | DEU | 48.83 | 12.97 | 0.84 |
| Dormagen | DEU | 51.10 | 6.95 | 1.03 |
| Dortmund | DEU | 51.53 | 7.45 | 0.92 |
| Duisburg | DEU | 51.43 | 6.75 | 1.00 |
| Dusseldorf | DEU | 51.25 | 6.77 | 1.02 |
| Eisenhuttenstadt | DEU | 52.15 | 14.62 | 0.84 |
| Emmerich | DEU | 51.85 | 6.25 | 0.89 |
| Erftstadt | DEU | 50.80 | 6.75 | 0.95 |
| Essen | DEU | 51.45 | 7.02 | 0.94 |
| Frankfurt | DEU | 50.12 | 8.67 | 0.95 |
| Geesthacht | DEU | 53.43 | 10.38 | 0.74 |
| Gelsenkirchen | DEU | 51.50 | 7.08 | 0.94 |
| Gernsheim | DEU | 49.75 | 8.47 | 1.06 |
| Greifswald | DEU | 54.10 | 13.38 | 0.86 |
| Gromitz | DEU | 54.15 | 10.98 | 1.09 |
| Haren | DEU | 52.80 | 7.25 | 0.86 |
| Havelberg | DEU | 52.83 | 12.07 | 0.81 |
| Heringsdorf | DEU | 53.97 | 14.17 | 1.01 |
| Hohenhorn | DEU | 53.47 | 10.37 | 0.74 |
| Homberg | DEU | 51.45 | 6.72 | 1.00 |
| Hoya | DEU | 52.80 | 9.13 | 0.79 |
| Ibbenburen | DEU | 52.28 | 7.73 | 0.80 |
| Kehl | DEU | 48.58 | 7.83 | 1.10 |
| Koblenz | DEU | 50.33 | 7.58 | 0.84 |
| Krefeld | DEU | 51.33 | 6.57 | 1.00 |
| Kroslin | DEU | 54.13 | 13.75 | 0.71 |
| Ladebow | DEU | 54.10 | 13.45 | 0.86 |
| Lahnstein | DEU | 50.30 | 7.62 | 0.84 |
| Lauenburg | DEU | 53.38 | 10.55 | 0.75 |
| Lauterbach | DEU | 54.33 | 13.52 | 0.69 |

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|---|---|---|---|---|
| Leer | DEU | 53.22 | 7.45 | 0.91 |
| Leeseringen | DEU | 52.58 | 9.13 | 0.81 |
| Leverkusen | DEU | 51.02 | 7.03 | 0.93 |
| Lubmin | DEU | 54.12 | 13.60 | 0.87 |
| Magdeburg | DEU | 52.13 | 11.62 | 0.81 |
| Mainz | DEU | 50.00 | 8.28 | 0.97 |
| Minden | DEU | 52.30 | 8.90 | 0.80 |
| Monheim | DEU | 51.12 | 6.82 | 1.02 |
| Moselkern | DEU | 50.18 | 7.37 | 0.87 |
| Mukran | DEU | 54.48 | 13.58 | 0.67 |
| Mulheim | DEU | 50.95 | 7.05 | 1.02 |
| Neckarsteinach | DEU | 49.43 | 8.80 | 0.89 |
| Neuss | DEU | 51.20 | 6.70 | 1.02 |
| Neuss/Dusseldorf | DEU | 51.20 | 6.70 | 1.02 |
| Neuwied | DEU | 50.43 | 7.48 | 0.94 |
| Nienburg | DEU | 52.63 | 9.22 | 0.80 |
| Nuremberg | DEU | 49.45 | 11.05 | 0.80 |
| Orsoy | DEU | 51.53 | 6.68 | 0.97 |
| Osnabruck | DEU | 52.27 | 8.03 | 0.78 |
| Papenburg | DEU | 53.08 | 7.38 | 0.85 |
| Passau | DEU | 48.58 | 13.47 | 0.77 |
| Peenemunde | DEU | 54.12 | 13.77 | 0.71 |
| Peine | DEU | 52.32 | 10.22 | 0.79 |
| Porz | DEU | 50.88 | 7.05 | 1.02 |
| Regensburg | DEU | 49.02 | 12.12 | 0.75 |
| Remagen | DEU | 50.57 | 7.22 | 0.91 |
| Rheinhausen | DEU | 51.42 | 6.73 | 1.00 |
| Rinteln | DEU | 52.20 | 9.08 | 0.78 |
| Rosslau | DEU | 51.90 | 12.27 | 0.84 |
| Rostock | DEU | 54.15 | 12.10 | 0.90 |
| Ruhrort | DEU | 51.45 | 6.73 | 1.00 |
| Salzgitter | DEU | 52.22 | 10.33 | 0.79 |
| Sassnitz | DEU | 54.52 | 13.63 | 0.67 |
| Stralsund | DEU | 54.32 | 13.10 | 0.86 |
| Sturzelberg | DEU | 51.12 | 6.80 | 1.02 |
| Stuttgart | DEU | 48.78 | 9.20 | 0.91 |
| Tangermunde | DEU | 52.57 | 11.97 | 0.81 |
| Ueckermunde | DEU | 53.73 | 14.28 | 0.71 |
| Urdingen | DEU | 51.35 | 6.67 | 0.99 |
| Vallendar | DEU | 50.40 | 7.62 | 0.92 |
| Vierow | DEU | 54.10 | 13.57 | 0.87 |
| Walsum | DEU | 51.53 | 6.68 | 0.97 |
| Warnemunde | DEU | 54.18 | 12.08 | 0.95 |
| Weissenthurm | DEU | 50.42 | 7.48 | 0.94 |
| Wesel | DEU | 51.65 | 6.60 | 0.97 |

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|---|---|---|---|---|
| Wesseling | DEU | 50.83 | 7.00 | 0.96 |
| Wolgast | DEU | 54.05 | 13.78 | 0.71 |
| Worms | DEU | 49.63 | 8.35 | 1.09 |
| Wurzburg | DEU | 49.78 | 9.93 | 0.74 |
| Aggersund | DNK | 57.02 | 9.28 | 0.59 |
| Allinge | DNK | 55.28 | 14.80 | 0.65 |
| Fur | DNK | 56.83 | 9.00 | 0.57 |
| Gudhjem | DNK | 55.22 | 14.97 | 0.78 |
| Hammeren | DNK | 55.28 | 14.75 | 0.65 |
| Hammerhavn | DNK | 55.27 | 14.75 | 0.65 |
| Hasle | DNK | 55.18 | 14.70 | 0.66 |
| Hvalpsund | DNK | 56.68 | 9.20 | 0.54 |
| Logstor | DNK | 56.97 | 9.25 | 0.54 |
| Nekso | DNK | 55.07 | 15.15 | 0.68 |
| Nykobing | DNK | 56.80 | 8.87 | 0.70 |
| Ronne | DNK | 55.10 | 14.70 | 0.66 |
| Skarrehage | DNK | 56.95 | 8.87 | 0.65 |
| Skive | DNK | 56.57 | 9.03 | 0.55 |
| Stege | DNK | 54.98 | 12.28 | 0.70 |
| Struer | DNK | 56.50 | 8.60 | 1.10 |
| Stubbekobing | DNK | 54.88 | 12.03 | 0.47 |
| Svaneke | DNK | 55.13 | 15.15 | 0.68 |
| Tejn | DNK | 55.23 | 14.83 | 0.65 |
| Thisted | DNK | 56.95 | 8.70 | 0.63 |
| Vang | DNK | 55.27 | 14.75 | 0.65 |
| Bekker | EST | 59.45 | 24.67 | 0.52 |
| Dirhami | EST | 59.22 | 23.50 | 0.46 |
| Forby | EST | 59.00 | 23.17 | 0.46 |
| Haapsalu | EST | 58.95 | 23.53 | 0.57 |
| Heltermaa | EST | 58.87 | 23.07 | 0.51 |
| Kuivastu | EST | 58.58 | 23.40 | 0.52 |
| Kunda | EST | 59.52 | 26.55 | 0.37 |
| Lehtma | EST | 59.05 | 22.70 | 0.49 |
| Loksa | EST | 59.58 | 25.72 | 0.40 |
| Meeruse | EST | 59.45 | 24.68 | 0.53 |
| Miiduranna | EST | 59.50 | 24.82 | 0.43 |
| Montu | EST | 57.95 | 22.12 | 0.50 |
| Muuga | EST | 59.50 | 24.97 | 0.43 |
| Narva Joesuu | EST | 59.47 | 28.05 | 0.48 |
| Paldiski | EST | 59.35 | 24.05 | 0.45 |
| Paljassaare | EST | 59.45 | 24.70 | 0.53 |
| Parnu | EST | 58.38 | 24.48 | 0.59 |
| Peetri | EST | 59.45 | 24.73 | 0.53 |
| Prangli Island | EST | 59.63 | 25.00 | 0.42 |
| Rohukula | EST | 58.90 | 23.42 | 0.51 |

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|---|---|---|---|---|
| Roomassaare | EST | 58.22 | 22.52 | 0.49 |
| Saaremaa Harbour | EST | 58.53 | 22.23 | 0.50 |
| Sillamae | EST | 59.40 | 27.78 | 0.48 |
| Tallinn | EST | 59.45 | 24.75 | 0.53 |
| Veere | EST | 58.45 | 22.05 | 0.58 |
| Virtsu | EST | 58.58 | 23.55 | 0.56 |
| Dalsbruk | FIN | 60.03 | 22.52 | 0.54 |
| Frojdbole | FIN | 60.15 | 19.92 | 0.48 |
| Galtby | FIN | 60.18 | 21.58 | 0.47 |
| Hamina | FIN | 60.57 | 27.18 | 0.51 |
| Hanko | FIN | 59.82 | 22.97 | 0.47 |
| Helsinki | FIN | 60.17 | 24.95 | 0.56 |
| Houtskar | FIN | 60.22 | 21.37 | 0.48 |
| Imatra | FIN | 61.17 | 28.83 | 0.36 |
| Inkoo | FIN | 60.05 | 24.02 | 0.47 |
| Isnas | FIN | 60.40 | 26.00 | 0.46 |
| Joensuu | FIN | 62.60 | 29.75 | 0.32 |
| Joutseno | FIN | 61.13 | 28.48 | 0.36 |
| Kalajoki | FIN | 64.25 | 23.93 | 0.63 |
| Kantvik | FIN | 60.08 | 24.38 | 0.47 |
| Kaskinen | FIN | 62.38 | 21.22 | 0.47 |
| Kaukas | FIN | 61.07 | 28.22 | 0.36 |
| Kaukopaa | FIN | 61.25 | 28.87 | 0.33 |
| Kemi | FIN | 65.73 | 24.57 | 0.47 |
| Kokkila | FIN | 60.33 | 22.87 | 0.52 |
| Kokkola | FIN | 63.83 | 23.13 | 0.55 |
| Korpo | FIN | 60.15 | 21.55 | 0.47 |
| Kotka | FIN | 60.47 | 26.95 | 0.38 |
| Koverhar | FIN | 59.88 | 23.22 | 0.46 |
| Kristiinankaupunki | FIN | 62.27 | 21.32 | 0.46 |
| Kronvik | FIN | 63.05 | 21.52 | 0.40 |
| Kuopio | FIN | 62.85 | 27.50 | 0.33 |
| Kustavi | FIN | 60.57 | 21.33 | 0.51 |
| Kuuslahti | FIN | 63.12 | 27.75 | 0.36 |
| Lapaluoto | FIN | 64.67 | 24.42 | 0.43 |
| Lappeenranta | FIN | 61.07 | 28.25 | 0.36 |
| Lappohja | FIN | 59.90 | 23.27 | 0.46 |
| Lappvik | FIN | 59.90 | 23.27 | 0.46 |
| Lauritsala | FIN | 61.08 | 28.33 | 0.36 |
| Loviisa | FIN | 60.45 | 26.23 | 0.48 |
| Luvia | FIN | 61.33 | 21.57 | 0.47 |
| Mantyluoto | FIN | 61.58 | 21.50 | 0.47 |
| Martinniemi | FIN | 65.22 | 25.28 | 0.45 |
| Maxmo | FIN | 63.20 | 22.03 | 0.39 |
| Merikarvia | FIN | 61.85 | 21.47 | 0.45 |

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|---|---|---|---|---|
| Mjosund | FIN | 60.22 | 22.47 | 0.55 |
| Mustola | FIN | 61.07 | 28.30 | 0.36 |
| Naantali | FIN | 60.47 | 22.02 | 0.54 |
| Nyhamn | FIN | 62.17 | 21.33 | 0.46 |
| Olkiluoto | FIN | 61.25 | 21.50 | 0.49 |
| Oulu | FIN | 65.00 | 25.47 | 0.45 |
| Parainen | FIN | 60.28 | 22.30 | 0.54 |
| Pateniemi | FIN | 65.08 | 25.40 | 0.45 |
| Perno | FIN | 60.45 | 26.05 | 0.47 |
| Pietarsaari | FIN | 63.68 | 22.70 | 0.52 |
| Pori | FIN | 61.48 | 21.80 | 0.46 |
| Puhos | FIN | 62.10 | 29.92 | 0.32 |
| Raahe | FIN | 64.68 | 24.48 | 0.41 |
| Rahja | FIN | 64.20 | 23.73 | 0.41 |
| Rauma | FIN | 61.13 | 21.50 | 0.47 |
| Ristiina | FIN | 61.53 | 27.42 | 0.30 |
| Roytta | FIN | 65.77 | 24.15 | 0.46 |
| Salo | FIN | 60.38 | 23.17 | 0.51 |
| Savonlinna | FIN | 61.90 | 28.92 | 0.34 |
| Siilinjarvi | FIN | 63.08 | 27.67 | 0.35 |
| Sipoo | FIN | 60.37 | 25.32 | 0.48 |
| Skogby | FIN | 59.92 | 23.32 | 0.46 |
| Skoldvik | FIN | 60.30 | 25.55 | 0.50 |
| Skuru | FIN | 60.10 | 23.55 | 0.49 |
| Stromma | FIN | 60.18 | 22.90 | 0.52 |
| Summa | FIN | 60.53 | 27.12 | 0.51 |
| Svartback | FIN | 60.28 | 25.53 | 0.50 |
| Taalintehdas | FIN | 60.02 | 22.52 | 0.54 |
| Tammisaari | FIN | 59.98 | 23.43 | 0.51 |
| Teijo | FIN | 60.25 | 22.95 | 0.52 |
| Tolkkinen | FIN | 60.33 | 25.58 | 0.50 |
| Tornio | FIN | 65.85 | 24.15 | 0.47 |
| Tupavuori | FIN | 60.45 | 22.07 | 0.54 |
| Turku | FIN | 60.43 | 22.22 | 0.55 |
| Uusikaupunki | FIN | 60.80 | 21.40 | 0.51 |
| Vaasa | FIN | 63.10 | 21.62 | 0.40 |
| Valkom | FIN | 60.42 | 26.27 | 0.48 |
| Varkaus | FIN | 62.33 | 27.83 | 0.35 |
| Vartsala | FIN | 60.33 | 23.02 | 0.51 |
| Vastanfjard | FIN | 60.05 | 22.65 | 0.54 |
| Veitsiluoto | FIN | 65.70 | 24.62 | 0.47 |
| Annay sous Lens | FRA | 50.47 | 2.87 | 0.99 |
| Bethune | FRA | 50.53 | 2.63 | 1.01 |
| Duclair | FRA | 49.45 | 0.87 | 1.10 |
| Elbeuf | FRA | 49.28 | 1.12 | 1.09 |

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|---|---|---|---|---|
| Gaillon | FRA | 49.17 | 1.32 | 1.07 |
| Grand Couronne | FRA | 49.37 | 0.98 | 1.10 |
| La Mailleraye | FRA | 49.48 | 0.77 | 1.08 |
| Le Trait | FRA | 49.47 | 0.80 | 1.08 |
| Les Andelys | FRA | 49.25 | 1.43 | 1.06 |
| Lille | FRA | 50.65 | 3.08 | 1.00 |
| Lillebonne | FRA | 49.52 | 0.53 | 1.05 |
| Limay | FRA | 48.97 | 1.78 | 1.10 |
| Mantes | FRA | 48.98 | 1.72 | 1.10 |
| Petit Couronne | FRA | 49.37 | 1.00 | 1.10 |
| Rouen | FRA | 49.48 | 1.08 | 1.08 |
| St. Etienne du Rouvray | FRA | 49.37 | 1.12 | 1.08 |
| St. Wandrille | FRA | 49.53 | 0.75 | 1.04 |
| Strasbourg | FRA | 48.57 | 7.70 | 1.10 |
| Vernon | FRA | 49.08 | 1.48 | 1.08 |
| Villequier | FRA | 49.50 | 0.67 | 1.10 |
| Acton Grange | GBR | 53.37 | -2.63 | 1.04 |
| Alloa | GBR | 56.10 | -3.80 | 0.92 |
| Althorpe Wharf | GBR | 53.57 | -0.73 | 0.91 |
| Anderton | GBR | 53.27 | -2.52 | 0.96 |
| Aylesford | GBR | 51.27 | 0.47 | 1.04 |
| Barton | GBR | 53.47 | -2.37 | 0.96 |
| Beckingham | GBR | 53.40 | -0.83 | 0.89 |
| Beverley | GBR | 53.85 | -0.43 | 0.92 |
| Bowling | GBR | 55.93 | -4.50 | 0.81 |
| Burton upon Stather | GBR | 53.65 | -0.68 | 0.92 |
| Coulport | GBR | 56.07 | -4.88 | 0.85 |
| Dalmuir | GBR | 55.90 | -4.43 | 0.74 |
| Dingwall | GBR | 57.60 | -4.42 | 1.03 |
| Drax | GBR | 53.73 | -0.98 | 0.87 |
| Dumbarton | GBR | 55.93 | -4.57 | 0.87 |
| Dunglass | GBR | 55.93 | -4.52 | 0.81 |
| Faslane Dock | GBR | 56.07 | -4.82 | 0.75 |
| Finnart | GBR | 56.12 | -4.83 | 0.74 |
| Flixborough | GBR | 53.62 | -0.68 | 0.91 |
| Gainsborough | GBR | 53.40 | -0.77 | 0.89 |
| Garelochhead | GBR | 56.08 | -4.83 | 0.77 |
| Glasgow | GBR | 55.87 | -4.28 | 0.74 |
| Glenmallan | GBR | 56.12 | -4.82 | 0.72 |
| Gloucester | GBR | 51.87 | -2.22 | 1.05 |
| Goole | GBR | 53.70 | -0.87 | 0.90 |
| Gourock | GBR | 55.95 | -4.80 | 1.06 |
| Greenock | GBR | 55.95 | -4.73 | 1.09 |
| Grove Wharf | GBR | 53.60 | -0.68 | 0.91 |
| Gunness | GBR | 53.58 | -0.72 | 0.91 |

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|---|---|---|---|---|
| Gunness Wharf | GBR | 53.58 | -0.68 | 0.91 |
| Halling | GBR | 51.37 | 0.01 | 1.06 |
| Helensburgh | GBR | 56.02 | -4.73 | 1.03 |
| Howdendyke | GBR | 53.75 | -0.87 | 0.90 |
| Irlam | GBR | 53.43 | -2.42 | 0.98 |
| Irwell | GBR | 53.47 | -2.35 | 0.96 |
| Keadby | GBR | 53.60 | -0.67 | 0.91 |
| Kilcreggan | GBR | 55.98 | -4.82 | 1.06 |
| Kinlochleven | GBR | 56.72 | -4.98 | 0.91 |
| Knottingley | GBR | 53.72 | -1.23 | 0.86 |
| Latchford | GBR | 53.38 | -2.57 | 1.01 |
| London | GBR | 51.50 | -0.07 | 1.10 |
| Manchester | GBR | 53.47 | -2.28 | 0.97 |
| Neap House | GBR | 53.62 | -0.67 | 0.91 |
| Northwich | GBR | 53.27 | -2.53 | 0.96 |
| Old Kilpatrick | GBR | 55.92 | -4.45 | 0.74 |
| Paisley | GBR | 55.85 | -4.43 | 0.74 |
| Partington | GBR | 53.43 | -2.43 | 0.98 |
| Perth | GBR | 56.40 | -3.43 | 0.81 |
| Port Glasgow | GBR | 55.93 | -4.68 | 0.97 |
| Renfrew | GBR | 55.87 | -4.40 | 0.74 |
| Rosneath | GBR | 56.02 | -4.80 | 0.86 |
| Selby | GBR | 53.78 | -1.07 | 0.86 |
| Shandon | GBR | 56.05 | -4.82 | 0.75 |
| Snodland | GBR | 51.33 | 0.45 | 1.08 |
| Thorne | GBR | 53.62 | -0.97 | 0.91 |
| Warrington | GBR | 53.40 | -2.60 | 1.01 |
| Winnington | GBR | 53.28 | -2.52 | 0.96 |
| Kangerlussuaq | GRL | 66.97 | -50.95 | 1.08 |
| Donegal | IRL | 54.65 | -8.10 | 1.05 |
| Limerick | IRL | 52.67 | -8.63 | 1.02 |
| Klaipeda | LTU | 55.72 | 21.13 | 0.71 |
| Engure | LVA | 57.17 | 23.23 | 0.42 |
| Labrags | LVA | 56.98 | 21.37 | 0.65 |
| Liepaja | LVA | 56.52 | 21.02 | 0.75 |
| Mersrags | LVA | 57.37 | 23.13 | 0.43 |
| Pavilosta | LVA | 56.90 | 21.18 | 0.72 |
| Riga | LVA | 56.97 | 24.10 | 0.60 |
| Roja | LVA | 57.50 | 22.82 | 0.46 |
| Salacgriva | LVA | 57.75 | 24.37 | 0.54 |
| Skulte | LVA | 57.32 | 24.40 | 0.57 |
| Ventspils | LVA | 57.40 | 21.55 | 0.71 |
| Aalst | NLD | 51.38 | 5.45 | 0.95 |
| Alblasserdam | NLD | 51.87 | 4.62 | 0.89 |
| Ameide | NLD | 51.95 | 4.95 | 0.89 |

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|---|---|---|---|---|
| Arnhem | NLD | 51.97 | 5.88 | 0.88 |
| Assen | NLD | 53.00 | 6.57 | 0.79 |
| Bergambacht | NLD | 51.93 | 4.78 | 0.89 |
| Bergum | NLD | 53.20 | 5.98 | 1.07 |
| Bolnes | NLD | 51.90 | 4.57 | 0.89 |
| Bruinisse | NLD | 51.67 | 4.10 | 1.03 |
| Capelle aan den Yssel | NLD | 51.92 | 4.57 | 0.89 |
| Culemborg | NLD | 51.95 | 5.22 | 0.89 |
| Deest | NLD | 51.88 | 5.67 | 0.89 |
| Den Bommel | NLD | 51.72 | 4.28 | 1.00 |
| Dintelmond | NLD | 51.67 | 4.38 | 0.97 |
| Dinteloord | NLD | 51.63 | 4.37 | 0.98 |
| Dodewaard | NLD | 51.90 | 5.63 | 0.89 |
| Dordrecht | NLD | 51.80 | 4.65 | 0.89 |
| Drachten | NLD | 53.12 | 6.10 | 1.08 |
| Druten | NLD | 51.88 | 5.62 | 0.89 |
| Eindhoven | NLD | 51.43 | 5.50 | 0.95 |
| Fijnaart | NLD | 51.63 | 4.48 | 0.96 |
| Geertruidenberg | NLD | 51.72 | 4.87 | 0.92 |
| Gendt | NLD | 51.87 | 5.98 | 0.88 |
| Gorinchem | NLD | 51.82 | 4.98 | 0.92 |
| Grave | NLD | 51.75 | 5.75 | 0.91 |
| Groot-Ammers | NLD | 51.92 | 4.83 | 0.89 |
| Grouw | NLD | 53.10 | 5.85 | 1.09 |
| Hardinxveld | NLD | 51.82 | 4.85 | 0.89 |
| Heerenveen | NLD | 52.95 | 5.92 | 1.10 |
| Heerewaarden | NLD | 51.82 | 5.38 | 0.91 |
| Heerjansdam | NLD | 51.83 | 4.57 | 0.89 |
| Heijen | NLD | 51.68 | 5.98 | 0.90 |
| Hellevoetsluis | NLD | 51.82 | 4.13 | 1.07 |
| Hendrik Ido Ambacht | NLD | 51.85 | 4.62 | 0.89 |
| Heusden | NLD | 51.73 | 5.15 | 0.91 |
| Huissen | NLD | 51.92 | 5.92 | 0.88 |
| Kinderdijk | NLD | 51.88 | 4.63 | 0.89 |
| Krimpen aan den Yssel | NLD | 51.90 | 4.58 | 0.89 |
| Lekkerkerk | NLD | 51.92 | 4.63 | 0.89 |
| Lithoyen | NLD | 51.82 | 5.43 | 0.91 |
| Lobith | NLD | 51.87 | 6.13 | 0.89 |
| Maasbracht | NLD | 51.13 | 5.87 | 0.98 |
| Maashees | NLD | 51.57 | 6.03 | 0.94 |
| Maassluis | NLD | 51.92 | 4.25 | 0.93 |
| Maastricht | NLD | 50.85 | 5.68 | 0.95 |
| Made | NLD | 51.68 | 4.80 | 0.93 |
| Middelharnis | NLD | 51.78 | 4.20 | 1.01 |
| Millingen aan den Rijn | NLD | 51.87 | 6.03 | 0.89 |

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|---|---|---|---|---|
| Moerdijk | NLD | 51.70 | 4.62 | 0.94 |
| Nieuw Lekkerland | NLD | 51.88 | 4.63 | 0.89 |
| Nieuwerkerk aan den Yssel | NLD | 51.97 | 4.58 | 0.89 |
| Nijmegen | NLD | 51.83 | 5.83 | 0.91 |
| Numansdorp | NLD | 51.72 | 4.42 | 0.98 |
| Ooltgensplaat | NLD | 51.68 | 4.33 | 0.98 |
| Oosterhout | NLD | 51.62 | 4.87 | 0.93 |
| Oss | NLD | 51.77 | 5.52 | 0.91 |
| Ouderkerk | NLD | 51.93 | 4.60 | 0.89 |
| Ouwerkerk | NLD | 51.63 | 3.98 | 1.10 |
| Overschie | NLD | 51.93 | 4.42 | 0.89 |
| Papendrecht | NLD | 51.83 | 4.63 | 0.89 |
| Raamsdonksveer | NLD | 51.70 | 4.92 | 0.92 |
| Renkum | NLD | 51.97 | 5.73 | 0.88 |
| Rhenen | NLD | 51.95 | 5.57 | 0.89 |
| Ridderkerk | NLD | 51.87 | 4.58 | 0.89 |
| Rijswijk | NLD | 51.78 | 5.02 | 0.91 |
| Roermond | NLD | 51.20 | 5.98 | 0.97 |
| Rotterdam | NLD | 51.90 | 4.48 | 0.90 |
| Sas van Ghent | NLD | 51.23 | 3.80 | 1.06 |
| Schiedam | NLD | 51.90 | 4.40 | 0.90 |
| 'sGravendeel | NLD | 51.77 | 4.60 | 0.89 |
| 'sHertogenbosch | NLD | 51.70 | 5.30 | 0.93 |
| Sliedrecht | NLD | 51.83 | 4.75 | 0.89 |
| Slikkerveer | NLD | 51.88 | 4.60 | 0.89 |
| Spijk | NLD | 51.87 | 5.05 | 0.89 |
| St. Annaland | NLD | 51.62 | 4.10 | 0.95 |
| Stavenisse | NLD | 51.58 | 4.00 | 1.10 |
| Stein | NLD | 50.97 | 5.77 | 0.95 |
| Swalmen | NLD | 51.22 | 6.02 | 0.97 |
| Tegelen | NLD | 51.35 | 6.13 | 0.96 |
| Tiel | NLD | 51.88 | 5.45 | 0.89 |
| Tilburg | NLD | 51.55 | 5.07 | 0.93 |
| Venlo | NLD | 51.37 | 6.17 | 0.96 |
| Vlaardingen | NLD | 51.90 | 4.35 | 0.90 |
| Waalwijk | NLD | 51.70 | 5.07 | 0.91 |
| Wageningen | NLD | 51.97 | 5.67 | 0.89 |
| Wanssum | NLD | 51.53 | 6.08 | 0.94 |
| Wartena | NLD | 53.15 | 5.90 | 0.94 |
| Werkendam | NLD | 51.80 | 4.90 | 0.89 |
| Willemstad | NLD | 51.68 | 4.40 | 0.96 |
| Zaltbommel | NLD | 51.80 | 5.20 | 0.92 |
| Zuilichem | NLD | 51.80 | 5.12 | 0.92 |
| Zwijndrecht | NLD | 51.82 | 4.65 | 0.89 |
| Aagotnes | NOR | 60.40 | 5.02 | 1.02 |

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|---|---|---|---|---|
| Aakra | NOR | 59.78 | 6.10 | 0.44 |
| Aalvik | NOR | 60.43 | 6.40 | 0.58 |
| Aandalsnes | NOR | 62.57 | 7.68 | 0.75 |
| Aardal | NOR | 61.23 | 7.68 | 0.78 |
| Aardalstangen | NOR | 61.23 | 7.70 | 0.78 |
| Alta | NOR | 69.97 | 23.25 | 0.61 |
| Anfiskaa | NOR | 66.28 | 14.10 | 0.71 |
| Askoy | NOR | 60.40 | 5.17 | 0.88 |
| Balholm | NOR | 61.22 | 6.53 | 0.44 |
| Balsfjord | NOR | 69.32 | 19.35 | 0.78 |
| Bergen | NOR | 60.40 | 5.32 | 0.81 |
| Bogen | NOR | 68.52 | 17.00 | 1.05 |
| Bryggja | NOR | 61.93 | 5.42 | 1.00 |
| Buvika | NOR | 63.32 | 10.18 | 0.80 |
| Bygstad | NOR | 61.38 | 5.67 | 0.68 |
| Dirdal | NOR | 58.78 | 6.23 | 0.64 |
| Dolvik | NOR | 60.32 | 5.25 | 0.87 |
| Eide | NOR | 60.52 | 6.72 | 0.61 |
| Eidfjord | NOR | 60.47 | 7.07 | 0.76 |
| Eikefet | NOR | 60.70 | 5.55 | 0.57 |
| Eikefjord | NOR | 61.60 | 5.47 | 0.87 |
| Eitrheimsneset | NOR | 60.10 | 6.53 | 0.73 |
| Elvebakken | NOR | 69.92 | 23.42 | 0.64 |
| Etne | NOR | 59.67 | 5.95 | 0.50 |
| Fiborgtangen | NOR | 63.72 | 11.17 | 0.33 |
| Finneid | NOR | 67.25 | 15.40 | 0.60 |
| Finnsnes | NOR | 69.23 | 17.97 | 0.89 |
| Fitjar | NOR | 59.92 | 5.28 | 1.05 |
| Flaam | NOR | 60.83 | 7.13 | 1.06 |
| Flekkefjord | NOR | 58.30 | 6.67 | 0.94 |
| Flora | NOR | 62.30 | 7.35 | 0.86 |
| Florvaag | NOR | 60.45 | 5.22 | 0.75 |
| Follafoss | NOR | 63.98 | 11.10 | 0.41 |
| Forde (Fordefjord) | NOR | 61.45 | 5.85 | 0.61 |
| Forde (Fuglesetfjord) | NOR | 61.03 | 5.82 | 0.54 |
| Fusa | NOR | 60.20 | 5.62 | 0.67 |
| Garnes | NOR | 60.43 | 5.48 | 0.54 |
| Gaupne | NOR | 61.42 | 7.30 | 0.48 |
| Glaerem | NOR | 63.02 | 8.52 | 0.61 |
| Gudvangen | NOR | 60.87 | 6.83 | 0.91 |
| Gullsmedvik | NOR | 66.33 | 14.15 | 0.71 |
| Hammerfall | NOR | 67.42 | 15.53 | 0.91 |
| Haugsvik | NOR | 61.83 | 5.00 | 0.95 |
| Hellesylt | NOR | 62.08 | 6.88 | 0.77 |
| Heroysund | NOR | 59.92 | 5.78 | 0.55 |

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|---|---|---|---|---|
| Herre | NOR | 59.10 | 9.53 | 0.69 |
| Hjelmaas | NOR | 60.53 | 5.35 | 0.97 |
| Hjelset | NOR | 62.77 | 7.50 | 0.99 |
| Holla | NOR | 63.28 | 9.12 | 1.00 |
| Hommelvik | NOR | 63.42 | 10.80 | 0.38 |
| Hoyanger | NOR | 61.22 | 6.07 | 0.74 |
| Hoylandsbygdi | NOR | 59.77 | 5.78 | 0.61 |
| Hoylandssundet | NOR | 59.78 | 5.80 | 0.59 |
| Husnes | NOR | 59.87 | 5.77 | 0.55 |
| Innhavet | NOR | 67.97 | 15.93 | 1.08 |
| Kaupanger | NOR | 61.18 | 7.23 | 0.39 |
| Knarrevik | NOR | 60.37 | 5.17 | 0.88 |
| Kongsmoen | NOR | 64.88 | 12.43 | 0.61 |
| Kvinesdal | NOR | 58.30 | 7.00 | 0.70 |
| Kyrksaetrora | NOR | 63.28 | 9.08 | 1.00 |
| Laerdalsoyri | NOR | 61.10 | 7.48 | 0.80 |
| Laksevaag | NOR | 60.38 | 5.30 | 0.81 |
| Langangen | NOR | 59.08 | 9.80 | 0.91 |
| Langstein | NOR | 63.55 | 10.92 | 0.71 |
| Leirvik | NOR | 59.77 | 5.52 | 1.05 |
| Levanger | NOR | 63.75 | 11.30 | 0.31 |
| Lofallstrand | NOR | 60.02 | 6.00 | 0.37 |
| Malm | NOR | 64.07 | 11.22 | 0.38 |
| Malvik | NOR | 63.42 | 10.63 | 0.38 |
| Menstad | NOR | 59.17 | 9.65 | 0.62 |
| Mo i Rana | NOR | 66.32 | 14.13 | 0.71 |
| Mosjoen | NOR | 65.83 | 13.18 | 0.80 |
| Muruvik | NOR | 63.43 | 10.85 | 0.36 |
| Namsos | NOR | 64.47 | 11.50 | 0.96 |
| Narvik | NOR | 68.43 | 17.43 | 0.70 |
| Naustdal | NOR | 61.52 | 5.72 | 0.81 |
| Norddal | NOR | 62.25 | 7.25 | 0.81 |
| Nordfjordeid | NOR | 61.90 | 6.02 | 0.68 |
| Nordveitgrend | NOR | 60.10 | 5.73 | 0.64 |
| Norheimsund | NOR | 60.37 | 6.15 | 0.63 |
| Nystrand | NOR | 59.10 | 9.72 | 0.98 |
| Odda | NOR | 60.07 | 6.55 | 0.73 |
| Olden | NOR | 61.83 | 6.82 | 0.95 |
| Olen | NOR | 59.60 | 5.83 | 0.48 |
| Omastrand | NOR | 60.22 | 5.97 | 0.42 |
| Onarheim | NOR | 59.95 | 5.65 | 0.65 |
| Orkanger | NOR | 63.32 | 9.85 | 0.57 |
| Orsta | NOR | 62.20 | 6.15 | 0.88 |
| Oystese | NOR | 60.38 | 6.22 | 0.52 |
| Porsgrunn | NOR | 59.13 | 9.65 | 0.69 |

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|---|---|---|---|---|
| Raudsand | NOR | 62.83 | 8.10 | 0.74 |
| Revsnes | NOR | 61.15 | 7.27 | 0.95 |
| Rognan | NOR | 67.08 | 15.37 | 0.63 |
| Ronningen | NOR | 63.70 | 10.58 | 0.50 |
| Rosendal | NOR | 59.98 | 6.02 | 0.66 |
| Rubbestadneset | NOR | 59.82 | 5.28 | 0.87 |
| Sagvaag | NOR | 59.77 | 5.38 | 0.99 |
| Salsbruket | NOR | 64.80 | 11.88 | 0.72 |
| Sandane | NOR | 61.77 | 6.22 | 0.74 |
| Sandnes | NOR | 58.85 | 5.75 | 0.99 |
| Sauda | NOR | 59.65 | 6.35 | 0.60 |
| Skaalevik | NOR | 60.37 | 5.22 | 0.85 |
| Skaanevik | NOR | 59.75 | 5.93 | 0.50 |
| Skien | NOR | 59.20 | 9.62 | 0.61 |
| Sogndal | NOR | 61.23 | 7.10 | 0.40 |
| Sorreisa | NOR | 69.13 | 18.13 | 0.83 |
| Steinkjer | NOR | 64.02 | 11.50 | 0.35 |
| Stjordal | NOR | 63.45 | 10.88 | 0.36 |
| Stord | NOR | 59.78 | 5.52 | 1.05 |
| Stryn | NOR | 61.92 | 6.73 | 0.68 |
| Sunndalsora | NOR | 62.68 | 8.60 | 0.77 |
| Svelgen | NOR | 61.77 | 5.30 | 0.88 |
| Sykkylven | NOR | 62.38 | 6.58 | 1.00 |
| Thamshavn | NOR | 63.33 | 9.87 | 0.57 |
| Torjul | NOR | 62.97 | 8.25 | 1.03 |
| Trondheim | NOR | 63.43 | 10.40 | 0.42 |
| Trosvik | NOR | 59.05 | 9.70 | 1.09 |
| Tyssebotn | NOR | 60.62 | 5.58 | 0.51 |
| Tyssedal | NOR | 60.12 | 6.57 | 0.73 |
| Ulvik | NOR | 60.57 | 6.92 | 0.58 |
| Uskedal | NOR | 59.93 | 5.88 | 0.52 |
| Vaagland | NOR | 63.12 | 8.32 | 1.00 |
| Vadheim | NOR | 61.20 | 5.82 | 0.59 |
| Vaksdal | NOR | 60.48 | 5.75 | 0.45 |
| Verdal | NOR | 63.78 | 11.43 | 0.31 |
| Vettas | NOR | 60.60 | 5.15 | 1.06 |
| Vik (Sognefjord) | NOR | 61.08 | 6.58 | 0.52 |
| Volda | NOR | 62.15 | 6.07 | 0.88 |
| Darlowo | POL | 54.43 | 16.38 | 0.92 |
| Elblag | POL | 54.17 | 19.40 | 0.85 |
| Frombork | POL | 54.35 | 19.67 | 0.82 |
| Gdansk | POL | 54.35 | 18.65 | 0.65 |
| Gdynia | POL | 54.53 | 18.55 | 0.67 |
| Kolobrzeg | POL | 54.18 | 15.57 | 1.08 |
| Kozle | POL | 50.32 | 18.13 | 0.75 |

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|---|---|---|---|---|
| Niechorze | POL | 54.10 | 15.07 | 0.99 |
| Nowa Sol | POL | 51.80 | 15.72 | 0.93 |
| Plock | POL | 52.53 | 19.67 | 0.78 |
| Police | POL | 53.55 | 14.60 | 1.01 |
| Puck | POL | 54.72 | 18.35 | 0.72 |
| Stepnica | POL | 53.65 | 14.63 | 1.01 |
| Swinoujscie | POL | 53.93 | 14.28 | 0.71 |
| Szczecin | POL | 53.42 | 14.55 | 0.98 |
| Tczew | POL | 54.08 | 18.77 | 0.74 |
| Ustka | POL | 54.58 | 16.87 | 0.69 |
| Wladyslawowo | POL | 54.80 | 18.42 | 0.66 |
| Wroclaw | POL | 51.08 | 17.00 | 0.76 |
| Annenskiy Most | RUS | 60.72 | 37.08 | 0.33 |
| Balakhna | RUS | 56.48 | 43.62 | 0.66 |
| Baltiysk | RUS | 54.65 | 19.90 | 0.68 |
| Belyy Ruchey | RUS | 60.90 | 36.83 | 0.32 |
| Berezniki | RUS | 59.43 | 56.82 | 0.59 |
| Brusnichnoye | RUS | 60.78 | 28.73 | 0.53 |
| Cheboksary | RUS | 56.13 | 47.23 | 0.72 |
| Cherepovets | RUS | 59.15 | 37.83 | 0.42 |
| Chkalovsk | RUS | 56.75 | 43.23 | 0.64 |
| Dudinka | RUS | 69.40 | 86.17 | 0.80 |
| Gorokhovets | RUS | 56.18 | 42.70 | 0.66 |
| Igarka | RUS | 67.50 | 86.67 | 0.77 |
| Kaliningrad | RUS | 54.72 | 20.52 | 0.79 |
| Kanonerskiy Island | RUS | 59.90 | 30.22 | 0.63 |
| Kazan | RUS | 55.75 | 49.17 | 0.82 |
| Khabarovsk | RUS | 48.50 | 135.17 | 1.05 |
| Khatanga | RUS | 71.97 | 102.42 | 0.84 |
| Kineshma | RUS | 57.45 | 42.12 | 0.56 |
| Kirovsk | RUS | 59.87 | 30.98 | 0.58 |
| Komsomolsk-na-Amure | RUS | 50.53 | 136.98 | 0.74 |
| Kondopoga | RUS | 62.20 | 34.28 | 0.29 |
| Kostroma | RUS | 57.77 | 40.93 | 0.59 |
| Kotlas | RUS | 61.25 | 46.65 | 0.47 |
| Krasnoyarsk | RUS | 56.08 | 92.77 | 0.68 |
| Kronshtadt | RUS | 60.00 | 29.77 | 0.57 |
| Lomonosov | RUS | 59.83 | 29.80 | 0.55 |
| Mago | RUS | 53.25 | 140.22 | 0.62 |
| Medvezhyegorsk | RUS | 62.93 | 34.47 | 0.26 |
| Mondoma | RUS | 59.93 | 37.47 | 0.35 |
| Murmansk | RUS | 68.97 | 33.08 | 0.66 |
| Naberezhnyye Chelny | RUS | 55.68 | 52.30 | 0.81 |
| Nadvoitsy | RUS | 63.93 | 34.33 | 0.26 |
| Naryan Mar | RUS | 67.65 | 53.02 | 0.63 |

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|---|---|---|---|---|
| Navashino | RUS | 55.55 | 42.18 | 0.69 |
| Nikolayevsk | RUS | 53.13 | 140.72 | 0.66 |
| Nizhnekamsk | RUS | 55.42 | 51.88 | 0.81 |
| Nizhnetambovskoye | RUS | 50.93 | 138.17 | 0.64 |
| Nizhniy Novgorod | RUS | 56.33 | 44.00 | 0.66 |
| Nizhnyaya Gavan | RUS | 52.40 | 140.43 | 0.59 |
| Novgorod | RUS | 58.50 | 31.33 | 0.44 |
| Novocheboksarsk | RUS | 56.10 | 47.48 | 0.75 |
| Oleniy | RUS | 49.45 | 143.28 | 0.94 |
| Otradnoye | RUS | 59.77 | 30.80 | 0.60 |
| Pechora | RUS | 65.23 | 57.30 | 0.59 |
| Perm | RUS | 58.02 | 56.17 | 0.64 |
| Petrodvorets | RUS | 59.88 | 29.92 | 0.60 |
| Petrozavodsk | RUS | 61.77 | 34.32 | 0.28 |
| Pionerskiy | RUS | 54.93 | 20.20 | 0.77 |
| Podporozhye | RUS | 60.92 | 34.03 | 0.33 |
| Primorsk | RUS | 60.37 | 28.63 | 0.52 |
| Priozersk | RUS | 61.02 | 30.13 | 0.54 |
| Pudozh | RUS | 61.83 | 36.53 | 0.33 |
| Rybinsk | RUS | 58.02 | 38.87 | 0.50 |
| Samara | RUS | 53.17 | 50.17 | 1.01 |
| Segezha | RUS | 63.70 | 34.32 | 0.26 |
| Shlisselburg | RUS | 59.93 | 31.13 | 0.58 |
| Solikamsk | RUS | 59.67 | 56.75 | 0.58 |
| Sosnovka | RUS | 56.23 | 51.28 | 0.78 |
| St. Petersburg | RUS | 59.93 | 30.30 | 0.63 |
| Svetlyy | RUS | 54.63 | 20.15 | 0.82 |
| Syzran | RUS | 53.17 | 48.48 | 1.04 |
| Tolyatti | RUS | 53.53 | 49.40 | 0.96 |
| Tomsk | RUS | 56.50 | 85.08 | 0.79 |
| Ust-Luga | RUS | 59.67 | 28.30 | 0.49 |
| Voznesenye | RUS | 61.02 | 35.47 | 0.34 |
| Vyborg | RUS | 60.72 | 28.73 | 0.53 |
| Vysotsk | RUS | 60.63 | 28.57 | 0.53 |
| Vytegra | RUS | 61.07 | 36.45 | 0.35 |
| Yakutsk | RUS | 62.02 | 129.73 | 0.99 |
| Yaroslavl | RUS | 57.57 | 39.87 | 0.58 |
| Zelenodolsk | RUS | 55.83 | 48.50 | 0.79 |
| Mitrovica | SCG | 42.90 | 20.87 | 0.84 |
| Aelvenaes | SWE | 59.37 | 13.18 | 0.24 |
| Ahus | SWE | 55.93 | 14.32 | 0.64 |
| Amal | SWE | 59.05 | 12.72 | 0.28 |
| Ar | SWE | 57.92 | 18.95 | 0.58 |
| Arvika | SWE | 59.67 | 12.58 | 0.22 |
| Backfors | SWE | 64.50 | 21.42 | 0.57 |

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|---|---|---|---|---|
| Balsta | SWE | 59.55 | 17.55 | 0.62 |
| Bergkvara | SWE | 56.38 | 16.08 | 0.62 |
| Borgholm | SWE | 56.88 | 16.65 | 0.60 |
| Bungenas | SWE | 57.82 | 19.08 | 0.57 |
| Burea | SWE | 64.62 | 21.25 | 0.57 |
| Byxelkrok | SWE | 57.30 | 17.03 | 0.46 |
| Dalaro | SWE | 59.13 | 18.42 | 0.52 |
| Degerhamn | SWE | 56.35 | 16.42 | 0.61 |
| Edsvalla | SWE | 59.43 | 13.23 | 0.24 |
| Elleholm | SWE | 56.17 | 14.73 | 0.78 |
| Enkoping | SWE | 59.63 | 17.08 | 0.56 |
| Farjestaden | SWE | 56.65 | 16.47 | 0.60 |
| Farosund | SWE | 57.87 | 19.07 | 0.57 |
| Fiskeback | SWE | 57.87 | 14.10 | 0.25 |
| Fittja | SWE | 59.23 | 17.85 | 0.71 |
| Forsmark | SWE | 60.42 | 18.20 | 0.45 |
| Furillen | SWE | 57.77 | 19.00 | 0.51 |
| Furusund | SWE | 59.65 | 18.90 | 0.51 |
| Gamleby | SWE | 57.90 | 16.42 | 0.76 |
| Gefle | SWE | 60.67 | 17.17 | 0.40 |
| Grisslehamn | SWE | 60.10 | 18.82 | 0.44 |
| Gruvon | SWE | 59.33 | 13.12 | 0.26 |
| Hallekis | SWE | 58.67 | 13.42 | 0.31 |
| Hallstavik | SWE | 60.05 | 18.60 | 0.45 |
| Haparanda | SWE | 65.83 | 24.13 | 0.46 |
| Haraholmen | SWE | 65.23 | 21.63 | 0.42 |
| Hargshamn | SWE | 60.17 | 18.48 | 0.45 |
| Hasselby | SWE | 59.37 | 17.82 | 0.68 |
| Hernosand | SWE | 62.63 | 17.93 | 0.39 |
| Hoglunda | SWE | 59.42 | 13.25 | 0.24 |
| Hogmarso | SWE | 59.65 | 18.85 | 0.51 |
| Honsater | SWE | 58.63 | 13.45 | 0.31 |
| Hornefors | SWE | 63.62 | 19.90 | 0.40 |
| Hudiksvall | SWE | 61.72 | 17.12 | 0.43 |
| Iggesund | SWE | 61.65 | 17.10 | 0.43 |
| Kagehamn | SWE | 64.83 | 21.03 | 0.40 |
| Kalix | SWE | 65.85 | 23.13 | 0.47 |
| Kallvik | SWE | 57.88 | 16.72 | 0.64 |
| Kallviken | SWE | 64.33 | 21.37 | 0.38 |
| Kalmar | SWE | 56.67 | 16.37 | 0.60 |
| Kalmarsand | SWE | 59.53 | 17.52 | 0.62 |
| Kapellskar | SWE | 59.72 | 19.00 | 0.48 |
| Kappelshamn | SWE | 57.85 | 18.78 | 0.58 |
| Karlshamn | SWE | 56.17 | 14.87 | 0.74 |
| Karlskrona | SWE | 56.17 | 15.60 | 0.73 |

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|---|---|---|---|---|
| Karlstad | SWE | 59.38 | 13.52 | 0.25 |
| Klintehamn | SWE | 57.38 | 18.20 | 0.80 |
| Koping | SWE | 59.52 | 16.00 | 0.15 |
| Kopmannebro | SWE | 58.77 | 12.52 | 0.35 |
| Kristinehamn | SWE | 59.32 | 14.12 | 0.27 |
| Krokstad | SWE | 59.10 | 12.92 | 0.29 |
| Kungsor | SWE | 59.43 | 16.10 | 0.20 |
| Kyrkebyn | SWE | 59.27 | 13.07 | 0.26 |
| Landsort | SWE | 58.73 | 17.87 | 0.48 |
| Lidkoping | SWE | 58.50 | 13.17 | 0.35 |
| Liljeholmsviken | SWE | 59.32 | 18.00 | 0.71 |
| Ljustero | SWE | 59.52 | 18.63 | 0.63 |
| Loudden | SWE | 59.33 | 18.13 | 0.73 |
| Lulea | SWE | 65.58 | 22.17 | 0.45 |
| Mariestad | SWE | 58.72 | 13.83 | 0.32 |
| Marsviken | SWE | 58.67 | 16.95 | 0.65 |
| Mem | SWE | 58.48 | 16.42 | 0.61 |
| Monsteras | SWE | 57.03 | 16.47 | 0.76 |
| Morbylanga | SWE | 56.53 | 16.37 | 0.60 |
| Motala | SWE | 58.53 | 15.07 | 0.29 |
| Munksund | SWE | 65.28 | 21.48 | 0.43 |
| Norrkoping | SWE | 58.60 | 16.20 | 0.61 |
| Norrsundet | SWE | 60.95 | 17.17 | 0.40 |
| Norrtalje | SWE | 59.75 | 18.70 | 0.60 |
| Norsbron | SWE | 59.42 | 13.23 | 0.24 |
| Nykoping | SWE | 58.75 | 17.02 | 0.64 |
| Nynashamn | SWE | 58.90 | 17.95 | 0.48 |
| Oaxen | SWE | 55.97 | 17.72 | 0.62 |
| Orebro | SWE | 59.28 | 15.18 | 0.26 |
| Oregrund | SWE | 60.33 | 18.45 | 0.45 |
| Ornskoldsvik | SWE | 63.27 | 18.72 | 0.41 |
| Oskarshamn | SWE | 57.27 | 16.45 | 0.76 |
| Otterbacken | SWE | 58.95 | 14.05 | 0.27 |
| Oxelosund | SWE | 58.67 | 17.12 | 0.48 |
| Pataholm | SWE | 56.92 | 16.43 | 0.60 |
| Ronehamn | SWE | 57.17 | 18.53 | 0.65 |
| Ronneby | SWE | 56.17 | 15.30 | 0.73 |
| Ronnskar | SWE | 64.67 | 21.28 | 0.57 |
| Rundvik | SWE | 63.53 | 19.45 | 0.41 |
| Saffle | SWE | 59.13 | 12.93 | 0.29 |
| Sandhamn | SWE | 59.28 | 18.90 | 0.50 |
| Sankt Anna | SWE | 58.33 | 16.70 | 0.65 |
| Seskaro Island | SWE | 65.72 | 23.75 | 0.59 |
| Sikea | SWE | 64.13 | 20.98 | 0.57 |
| Simpevarp | SWE | 57.42 | 16.67 | 0.63 |

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|---|---|---|---|---|
| Simrishamn | SWE | 55.55 | 14.37 | 0.64 |
| Sjotorp | SWE | 58.83 | 14.00 | 0.31 |
| Skattkar | SWE | 59.42 | 13.70 | 0.25 |
| Skelleftea | SWE | 64.73 | 20.95 | 0.41 |
| Skoghall | SWE | 59.32 | 13.45 | 0.30 |
| Skutskar | SWE | 60.65 | 17.40 | 0.43 |
| Slite | SWE | 57.70 | 18.82 | 0.66 |
| Slottsbron | SWE | 59.33 | 13.10 | 0.26 |
| Soderhamn | SWE | 61.32 | 17.10 | 0.44 |
| Soderkoping | SWE | 58.48 | 16.33 | 0.60 |
| Sodertalje | SWE | 59.20 | 17.63 | 0.50 |
| Solvesborg | SWE | 56.05 | 14.58 | 0.76 |
| Soraker | SWE | 62.50 | 17.50 | 0.41 |
| Spesshult | SWE | 59.07 | 12.92 | 0.29 |
| Stavsnas | SWE | 59.28 | 18.68 | 0.51 |
| Stockholm | SWE | 59.32 | 18.05 | 0.73 |
| Stocksund | SWE | 59.38 | 18.05 | 0.71 |
| Stora Vika | SWE | 58.93 | 17.78 | 0.48 |
| Storugns | SWE | 57.83 | 18.80 | 0.58 |
| Straa | SWE | 57.90 | 19.03 | 0.57 |
| Strangnas | SWE | 59.38 | 17.03 | 0.58 |
| Studsvik | SWE | 58.75 | 17.28 | 0.66 |
| Sturko | SWE | 56.08 | 15.67 | 0.73 |
| Sundsvall | SWE | 62.42 | 17.33 | 0.40 |
| Taxinge | SWE | 59.22 | 17.37 | 0.63 |
| Torko | SWE | 56.15 | 15.40 | 0.73 |
| Trelleborg | SWE | 55.37 | 13.15 | 0.80 |
| Umea | SWE | 63.70 | 20.35 | 0.44 |
| Uppsala | SWE | 59.87 | 17.65 | 0.31 |
| Valdemarsvik | SWE | 58.20 | 16.60 | 0.62 |
| Vaxholm | SWE | 59.38 | 18.33 | 0.69 |
| Vesteras | SWE | 59.60 | 16.43 | 0.18 |
| Vestervik | SWE | 57.75 | 16.65 | 0.63 |
| Visby | SWE | 57.65 | 18.28 | 0.79 |
| Ystad | SWE | 55.43 | 13.83 | 0.76 |
| Cherkassy | UKR | 49.43 | 32.05 | 0.98 |
| Kiev | UKR | 50.42 | 30.50 | 0.91 |
| Kremenchug | UKR | 49.05 | 33.42 | 1.06 |
| Alpena | USA | 45.05 | -83.43 | 0.64 |
| Ashland | USA | 46.58 | -90.90 | 0.53 |
| Bangor | USA | 44.80 | -68.78 | 0.92 |
| Bayfield | USA | 46.80 | -90.80 | 0.41 |
| Benton Harbour | USA | 42.12 | -86.45 | 0.99 |
| Brevort | USA | 46.00 | -85.03 | 0.56 |
| Bucksport | USA | 44.57 | -68.80 | 1.04 |

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|---|---|---|---|---|
| Buffington | USA | 41.63 | -87.42 | 1.09 |
| Burns Harbour | USA | 41.63 | -87.18 | 1.09 |
| Calcite | USA | 45.40 | -83.78 | 0.51 |
| Cedarville | USA | 45.98 | -84.35 | 0.38 |
| Charlevoix | USA | 45.32 | -85.22 | 0.73 |
| Cheboygan | USA | 45.67 | -84.47 | 0.54 |
| Chicago | USA | 41.83 | -87.63 | 1.04 |
| Detour | USA | 45.97 | -83.88 | 0.37 |
| Duluth | USA | 46.73 | -92.15 | 0.34 |
| Escanaba | USA | 45.78 | -87.07 | 0.69 |
| Ferrysburg | USA | 43.08 | -86.23 | 0.82 |
| Gary Harbour | USA | 41.60 | -87.35 | 1.07 |
| Grand Haven | USA | 43.07 | -86.25 | 0.84 |
| Green Bay | USA | 44.52 | -88.00 | 1.01 |
| Harbor Beach | USA | 43.83 | -82.65 | 0.71 |
| Holland (MI) | USA | 42.78 | -86.22 | 0.85 |
| Indiana Harbour | USA | 41.67 | -87.50 | 1.09 |
| Kalama | USA | 46.02 | -122.83 | 1.07 |
| Kenosha | USA | 42.58 | -87.82 | 0.84 |
| Kewaunee | USA | 44.45 | -87.52 | 0.50 |
| Ludington | USA | 43.97 | -86.45 | 0.56 |
| Mackinaw City | USA | 45.75 | -84.73 | 0.56 |
| Manistee | USA | 44.25 | -86.33 | 0.54 |
| Manitowoc | USA | 44.10 | -87.63 | 0.54 |
| Marine City | USA | 42.72 | -82.48 | 0.94 |
| Marinette | USA | 45.12 | -87.62 | 0.79 |
| Marquette | USA | 46.60 | -87.38 | 0.28 |
| Marysville | USA | 42.92 | -82.48 | 0.93 |
| Menominee | USA | 45.13 | -87.62 | 0.77 |
| Milwaukee | USA | 43.05 | -87.87 | 0.74 |
| Muskegon | USA | 43.18 | -86.23 | 0.77 |
| Ogdensburg | USA | 44.70 | -75.50 | 1.00 |
| Olympia | USA | 47.05 | -122.90 | 1.10 |
| Ontonagon | USA | 46.87 | -89.30 | 0.37 |
| Port Dolomite | USA | 45.97 | -84.27 | 0.44 |
| Port Huron | USA | 42.98 | -82.43 | 0.93 |
| Port Inland | USA | 45.97 | -85.87 | 0.53 |
| Port Washington | USA | 43.38 | -87.87 | 0.64 |
| Racine | USA | 42.73 | -87.80 | 0.84 |
| Rochester (NY) | USA | 43.28 | -77.60 | 1.01 |
| Rockport (MI) | USA | 45.20 | -83.38 | 0.51 |
| Rogers City | USA | 45.40 | -83.83 | 0.50 |
| Sheboygan | USA | 43.75 | -87.70 | 0.49 |
| Silver Bay | USA | 47.28 | -91.27 | 0.15 |
| South Brewer | USA | 44.78 | -68.78 | 0.92 |

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|---|---|---|---|---|
| South Haven | USA | 42.45 | -86.25 | 0.91 |
| St. Clair | USA | 42.82 | -82.47 | 0.94 |
| St. Joseph | USA | 42.08 | -86.50 | 1.02 |
| Stoneport | USA | 45.28 | -83.43 | 0.50 |
| Superior | USA | 46.72 | -92.08 | 0.33 |
| Taconite Harbour | USA | 47.50 | -90.92 | 0.12 |
| The Dalles | USA | 45.58 | -121.18 | 1.09 |
| Two Harbors | USA | 47.02 | -91.67 | 0.00 |
| Waddington | USA | 44.85 | -75.20 | 0.94 |
| Waukegan | USA | 42.37 | -87.83 | 0.96 |
| Whitefish Point | USA | 46.75 | -84.95 | 0.26 |
| Winterport | USA | 44.63 | -68.85 | 1.00 |

Appendix G. List of global ports that have highest environmental similarity to Presque Isle-Marquette. NIS originating from these ports have the highest potential for survival if introduced at Presque Isle-Marquette.

| Name | Country | Latitude | Longitude | Environmental Distance |
|---|---|---|---|---|
| Eckero | ALD | 60.22 | 19.60 | 0.44 |
| Farjsundet | ALD | 60.23 | 20.02 | 0.60 |
| Finstrom | ALD | 60.25 | 19.92 | 0.59 |
| Langnasudd | ALD | 60.12 | 20.30 | 0.62 |
| Mariehamn | ALD | 60.10 | 19.93 | 0.65 |
| Korneuburg | AUT | 48.37 | 16.33 | 0.81 |
| Linz | AUT | 48.32 | 14.30 | 0.59 |
| Vienna | AUT | 48.22 | 16.37 | 0.91 |
| Antwerp | BEL | 51.24 | 4.41 | 0.81 |
| Baasrode | BEL | 51.05 | 4.17 | 0.84 |
| Balen | BEL | 51.17 | 5.17 | 0.79 |
| Boom | BEL | 51.08 | 4.37 | 0.81 |
| Brussels | BEL | 50.83 | 4.32 | 0.79 |
| Buggenhout | BEL | 51.02 | 4.20 | 0.83 |
| Burcht | BEL | 51.20 | 4.33 | 0.82 |
| Chatelineau | BEL | 50.42 | 4.52 | 0.71 |
| Dendermonde | BEL | 51.03 | 4.12 | 0.84 |
| Doel | BEL | 51.32 | 4.27 | 0.83 |
| Engis | BEL | 50.58 | 5.40 | 0.67 |
| Ertvelde | BEL | 51.20 | 3.78 | 0.86 |
| Geel | BEL | 51.15 | 4.97 | 0.79 |
| Genk | BEL | 50.94 | 5.50 | 0.75 |
| Ghent | BEL | 51.09 | 3.75 | 0.85 |
| Grimbergen | BEL | 50.93 | 4.37 | 0.80 |
| Grobbendonk | BEL | 51.20 | 4.75 | 0.78 |
| Haren | BEL | 50.90 | 4.38 | 0.80 |
| Hemiksem | BEL | 51.15 | 4.34 | 0.81 |
| Hermalle sous Huy | BEL | 50.55 | 5.37 | 0.67 |
| Hingene | BEL | 51.12 | 4.27 | 0.83 |
| Hoboken | BEL | 51.17 | 4.33 | 0.83 |
| Humbeek | BEL | 50.97 | 4.38 | 0.80 |
| Kallo | BEL | 51.25 | 4.28 | 0.82 |
| Kapelle op den Bos | BEL | 51.02 | 4.37 | 0.81 |
| Kruibeke | BEL | 51.17 | 4.32 | 0.83 |
| Kwaadmechelen | BEL | 51.10 | 5.15 | 0.79 |
| Lanaken | BEL | 50.88 | 5.65 | 0.75 |
| Langerbrugge | BEL | 51.12 | 3.75 | 0.85 |
| Liefkenshoek | BEL | 51.30 | 4.28 | 0.83 |
| Liege | BEL | 50.64 | 5.57 | 0.69 |
| Lillo | BEL | 51.30 | 4.30 | 0.83 |
| Lixhe | BEL | 50.73 | 5.70 | 0.72 |
| Maasmechelen | BEL | 50.97 | 5.70 | 0.75 |
| Marly | BEL | 50.88 | 4.38 | 0.80 |
| Mechelen | BEL | 51.03 | 4.47 | 0.81 |
| Melle | BEL | 51.00 | 3.80 | 0.81 |

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|---|---|---|---|---|
| Merksem | BEL | 51.23 | 4.48 | 0.81 |
| Nameche | BEL | 50.47 | 4.98 | 0.68 |
| Niel | BEL | 51.12 | 4.33 | 0.83 |
| Olen | BEL | 51.15 | 4.87 | 0.79 |
| Puurs | BEL | 51.07 | 4.27 | 0.83 |
| Rieme | BEL | 51.17 | 3.77 | 0.86 |
| Ruisbroek | BEL | 50.78 | 4.28 | 0.79 |
| Rumst | BEL | 51.07 | 4.42 | 0.81 |
| Rupelmonde | BEL | 51.13 | 4.28 | 0.83 |
| Schelle | BEL | 51.13 | 4.32 | 0.83 |
| Schoten | BEL | 51.25 | 4.50 | 0.81 |
| Seilles | BEL | 50.50 | 5.08 | 0.61 |
| Sint-Kruis-Winkel | BEL | 51.15 | 3.80 | 0.86 |
| Temse | BEL | 51.13 | 4.22 | 0.83 |
| Terdonk | BEL | 51.15 | 3.78 | 0.86 |
| Terhagen | BEL | 51.08 | 4.38 | 0.81 |
| Tessenderlo | BEL | 51.07 | 5.08 | 0.79 |
| Tielrode | BEL | 51.12 | 4.22 | 0.83 |
| Tisselt | BEL | 51.03 | 4.37 | 0.81 |
| Val St. Lambert | BEL | 50.57 | 5.47 | 0.67 |
| Verbrande Brug | BEL | 50.95 | 4.38 | 0.80 |
| Vilvoorde | BEL | 50.95 | 4.42 | 0.80 |
| Willebroek | BEL | 51.05 | 4.35 | 0.81 |
| Wintham | BEL | 51.10 | 4.28 | 0.83 |
| Wondelgem | BEL | 51.08 | 3.72 | 0.85 |
| Zelzate | BEL | 51.20 | 3.80 | 0.86 |
| Zutendaal | BEL | 50.92 | 5.57 | 0.75 |
| Zwyndrecht | BEL | 51.22 | 4.33 | 0.82 |
| Amherstburg | CAN | 42.10 | -83.08 | 1.08 |
| Baddeck | CAN | 46.10 | -60.73 | 0.77 |
| Bath | CAN | 44.17 | -76.77 | 0.73 |
| Batiscan | CAN | 46.52 | -72.23 | 0.49 |
| Bayside | CAN | 45.17 | -67.13 | 0.81 |
| Becancour | CAN | 46.40 | -72.38 | 0.54 |
| Bella Coola | CAN | 52.38 | -126.77 | 0.57 |
| Belleville | CAN | 44.13 | -77.37 | 0.65 |
| Bowmanville | CAN | 43.90 | -78.67 | 0.50 |
| Boylston | CAN | 45.45 | -61.52 | 0.94 |
| Britt | CAN | 45.77 | -80.58 | 0.29 |
| Brockville | CAN | 44.60 | -75.63 | 0.75 |
| Bronte | CAN | 43.40 | -79.70 | 0.53 |
| Bruce Mines | CAN | 46.27 | -83.72 | 0.10 |
| Burlington | CAN | 43.32 | -79.75 | 0.61 |
| Cardinal | CAN | 44.78 | -75.33 | 0.78 |
| Chicoutimi | CAN | 48.43 | -71.08 | 0.47 |
| Clarenville | CAN | 48.17 | -53.95 | 1.04 |
| Clarkson | CAN | 43.50 | -79.60 | 0.55 |
| Cobourg | CAN | 43.95 | -78.17 | 0.61 |
| Colborne | CAN | 44.00 | -77.88 | 0.61 |
| Collingwood | CAN | 44.50 | -80.23 | 0.48 |

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|---|---|---|---|---|
| Contrecoeur | CAN | 45.88 | -73.20 | 0.65 |
| Corner Brook | CAN | 48.95 | -57.93 | 1.01 |
| Cornwall | CAN | 45.02 | -74.72 | 0.76 |
| Corunna | CAN | 42.88 | -82.45 | 0.66 |
| Cote Ste-Catherine | CAN | 45.41 | -73.58 | 0.76 |
| Country Harbour | CAN | 45.22 | -61.73 | 0.96 |
| Courtright | CAN | 42.80 | -82.45 | 0.66 |
| Erieau | CAN | 42.25 | -81.93 | 0.99 |
| Fort Erie | CAN | 42.93 | -78.95 | 0.96 |
| Fredericton | CAN | 45.95 | -66.65 | 0.44 |
| Gananoque | CAN | 44.32 | -76.15 | 0.81 |
| Goderich | CAN | 43.75 | -81.75 | 0.47 |
| Gold River | CAN | 49.68 | -126.12 | 0.71 |
| Goose Bay | CAN | 53.35 | -60.42 | 0.59 |
| Grondines | CAN | 46.75 | -72.03 | 0.41 |
| Hamilton | CAN | 43.23 | -79.85 | 0.54 |
| Hay River | CAN | 60.85 | -115.70 | 0.74 |
| Houston | CAN | 54.40 | -126.65 | 0.54 |
| Humberstone | CAN | 42.90 | -79.25 | 0.92 |
| Iona | CAN | 45.97 | -60.80 | 0.33 |
| Isaac's Harbour | CAN | 45.17 | -61.65 | 1.08 |
| Killarney | CAN | 45.97 | -81.52 | 0.18 |
| Kingston | CAN | 44.20 | -76.50 | 0.79 |
| Kitimat | CAN | 54.00 | -128.70 | 0.26 |
| Lanoraie | CAN | 45.97 | -73.18 | 0.65 |
| Lauzon | CAN | 46.82 | -71.15 | 0.46 |
| Levis | CAN | 46.82 | -71.18 | 0.52 |
| Little Current | CAN | 45.97 | -81.92 | 0.48 |
| Little Narrows | CAN | 45.98 | -60.98 | 0.29 |
| Long Sault | CAN | 45.02 | -74.90 | 0.69 |
| Marathon | CAN | 48.75 | -86.38 | 0.49 |
| Meldrum Bay | CAN | 45.92 | -83.10 | 0.12 |
| Michipicoten Harbour | CAN | 47.95 | -84.92 | 0.19 |
| Midland | CAN | 44.75 | -79.93 | 0.44 |
| Montréal | CAN | 45.50 | -73.55 | 0.79 |
| Mooretown | CAN | 42.85 | -82.47 | 0.66 |
| Morrisburg | CAN | 44.93 | -75.18 | 0.68 |
| Nanticoke | CAN | 42.82 | -80.07 | 0.85 |
| Nelson | CAN | 49.47 | -117.30 | 0.38 |
| Oakville | CAN | 43.43 | -79.67 | 0.52 |
| Ocean Falls | CAN | 52.35 | -127.70 | 0.61 |
| Oshawa | CAN | 43.87 | -78.83 | 0.50 |
| Ottawa | CAN | 45.40 | -75.70 | 0.69 |
| Owen Sound | CAN | 44.58 | -80.95 | 0.39 |
| Parry Sound | CAN | 45.37 | -80.05 | 0.41 |
| Picton | CAN | 44.00 | -77.13 | 0.73 |
| Pointe aux Trembles | CAN | 45.63 | -73.48 | 0.72 |
| Port Alberni | CAN | 49.23 | -125.00 | 0.64 |
| Port Alice | CAN | 50.38 | -127.45 | 0.84 |
| Port Burwell | CAN | 42.63 | -80.80 | 0.84 |

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|---|---|---|---|---|
| Port Colborne | CAN | 42.87 | -79.25 | 0.94 |
| Port Credit | CAN | 43.55 | -79.60 | 0.43 |
| Port Dalhousie | CAN | 43.20 | -79.27 | 0.67 |
| Port Dover | CAN | 42.78 | -80.20 | 0.81 |
| Port Hope | CAN | 43.95 | -78.28 | 0.59 |
| Port Maitland | CAN | 42.87 | -79.58 | 0.89 |
| Port McNicoll | CAN | 44.75 | -79.80 | 0.51 |
| Port Stanley | CAN | 42.67 | -81.22 | 0.84 |
| Port Weller | CAN | 43.23 | -79.22 | 0.71 |
| Prescott | CAN | 44.72 | -75.52 | 0.73 |
| Québec | CAN | 46.82 | -71.20 | 0.52 |
| Rupert Inlet | CAN | 50.55 | -127.57 | 1.08 |
| Sarnia | CAN | 42.98 | -82.42 | 0.65 |
| Sault Ste. Marie | CAN | 46.52 | -84.33 | 0.14 |
| Sombra | CAN | 42.70 | -82.47 | 0.66 |
| Sonora | CAN | 45.07 | -61.92 | 0.98 |
| Sorel | CAN | 46.05 | -73.12 | 0.69 |
| Spragge | CAN | 46.22 | -82.67 | 0.30 |
| St. Albans | CAN | 47.87 | -55.85 | 1.07 |
| St. Catharines | CAN | 43.17 | -79.27 | 0.64 |
| St. Romuald | CAN | 46.75 | -71.23 | 0.52 |
| St. Stephen | CAN | 45.20 | -67.28 | 0.58 |
| Ste. Croix | CAN | 46.63 | -71.73 | 0.47 |
| Stewart | CAN | 55.92 | -130.00 | 0.69 |
| Tahsis | CAN | 49.92 | -126.67 | 0.87 |
| Thessalon | CAN | 46.25 | -83.55 | 0.11 |
| Thorold | CAN | 43.08 | -79.17 | 0.90 |
| Three Rivers | CAN | 46.35 | -72.55 | 0.55 |
| Thunder Bay | CAN | 48.42 | -89.22 | 0.35 |
| Tobermory | CAN | 45.23 | -81.65 | 0.13 |
| Toronto | CAN | 43.63 | -79.38 | 0.45 |
| Tracy | CAN | 46.02 | -73.17 | 0.64 |
| Valleyfield | CAN | 45.22 | -74.08 | 0.74 |
| Wallaceburg | CAN | 42.60 | -82.40 | 0.66 |
| Welland | CAN | 42.97 | -79.22 | 0.86 |
| Weymouth | CAN | 44.45 | -66.02 | 0.72 |
| Wheatley | CAN | 42.08 | -82.43 | 1.00 |
| Whitby | CAN | 43.85 | -78.92 | 0.43 |
| Windsor | CAN | 42.32 | -83.05 | 0.83 |
| Zeballos | CAN | 49.98 | -126.85 | 1.02 |
| Basle | CHE | 47.55 | 7.57 | 0.74 |
| Fujin | CHN | 47.25 | 132.02 | 0.94 |
| Harbin | CHN | 45.73 | 126.60 | 1.03 |
| Heihe | CHN | 50.23 | 127.47 | 0.83 |
| Jiamusi | CHN | 46.80 | 130.35 | 0.94 |
| Panshi | CHN | 42.92 | 126.03 | 0.96 |
| Tongjiang | CHN | 47.63 | 132.50 | 0.94 |
| Chvaletice | CZE | 50.02 | 15.43 | 0.57 |
| Usti nad Labem | CZE | 50.67 | 14.03 | 0.49 |
| Aken | DEU | 51.85 | 12.03 | 0.61 |

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|---|---|---|---|---|
| Andernach | DEU | 50.42 | 7.38 | 0.72 |
| Anklam | DEU | 53.87 | 13.68 | 0.75 |
| Aschaffenburg | DEU | 49.95 | 9.17 | 0.67 |
| Barth | DEU | 54.37 | 12.73 | 0.68 |
| Bendorf | DEU | 50.42 | 7.58 | 0.69 |
| Berlin | DEU | 52.53 | 13.42 | 0.64 |
| Berne | DEU | 53.18 | 10.50 | 0.55 |
| Bingen | DEU | 49.95 | 7.90 | 0.75 |
| Bodenwerder | DEU | 51.97 | 9.50 | 0.51 |
| Boizenburg | DEU | 53.38 | 10.73 | 0.55 |
| Bonn | DEU | 50.72 | 7.08 | 0.79 |
| Brandenburg | DEU | 52.40 | 12.52 | 0.61 |
| Braunschweig | DEU | 52.25 | 10.50 | 0.59 |
| Brohl | DEU | 50.42 | 7.30 | 0.60 |
| Burgstaaken | DEU | 54.42 | 11.20 | 1.08 |
| Castrop Rauxel | DEU | 51.55 | 7.30 | 0.73 |
| Cologne | DEU | 50.93 | 7.00 | 0.82 |
| Deggendorf | DEU | 48.83 | 12.97 | 0.58 |
| Dormagen | DEU | 51.10 | 6.95 | 0.81 |
| Dortmund | DEU | 51.53 | 7.45 | 0.72 |
| Duisburg | DEU | 51.43 | 6.75 | 0.79 |
| Dusseldorf | DEU | 51.25 | 6.77 | 0.81 |
| Eisenhuttenstadt | DEU | 52.15 | 14.62 | 0.58 |
| Emmerich | DEU | 51.85 | 6.25 | 0.71 |
| Erftstadt | DEU | 50.80 | 6.75 | 0.74 |
| Essen | DEU | 51.45 | 7.02 | 0.74 |
| Frankfurt | DEU | 50.12 | 8.67 | 0.71 |
| Geesthacht | DEU | 53.43 | 10.38 | 0.54 |
| Gelsenkirchen | DEU | 51.50 | 7.08 | 0.74 |
| Germersheim | DEU | 49.22 | 8.38 | 0.91 |
| Gernsheim | DEU | 49.75 | 8.47 | 0.81 |
| Greifswald | DEU | 54.10 | 13.38 | 0.72 |
| Gromitz | DEU | 54.15 | 10.98 | 1.04 |
| Haren | DEU | 52.80 | 7.25 | 0.70 |
| Havelberg | DEU | 52.83 | 12.07 | 0.58 |
| Heiligenhafen | DEU | 54.37 | 10.98 | 1.08 |
| Heringsdorf | DEU | 53.97 | 14.17 | 0.81 |
| Hohenhorn | DEU | 53.47 | 10.37 | 0.54 |
| Homberg | DEU | 51.45 | 6.72 | 0.79 |
| Hoya | DEU | 52.80 | 9.13 | 0.58 |
| Ibbenburen | DEU | 52.28 | 7.73 | 0.61 |
| Karlsruhe | DEU | 49.05 | 8.33 | 0.93 |
| Kehl | DEU | 48.58 | 7.83 | 0.85 |
| Koblenz | DEU | 50.33 | 7.58 | 0.62 |
| Krefeld | DEU | 51.33 | 6.57 | 0.79 |
| Kroslin | DEU | 54.13 | 13.75 | 0.64 |
| Ladebow | DEU | 54.10 | 13.45 | 0.72 |
| Lahnstein | DEU | 50.30 | 7.62 | 0.62 |
| Lauenburg | DEU | 53.38 | 10.55 | 0.55 |
| Lauterbach | DEU | 54.33 | 13.52 | 0.64 |

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|---|---|---|---|---|
| Leer | DEU | 53.22 | 7.45 | 0.74 |
| Leeseringen | DEU | 52.58 | 9.13 | 0.60 |
| Leverkusen | DEU | 51.02 | 7.03 | 0.72 |
| Lubmin | DEU | 54.12 | 13.60 | 0.72 |
| Ludwigshafen am Rhein | DEU | 49.47 | 8.45 | 0.88 |
| Magdeburg | DEU | 52.13 | 11.62 | 0.57 |
| Mainz | DEU | 50.00 | 8.28 | 0.73 |
| Mannheim | DEU | 49.48 | 8.47 | 0.88 |
| Minden | DEU | 52.30 | 8.90 | 0.60 |
| Monheim | DEU | 51.12 | 6.82 | 0.80 |
| Moselkern | DEU | 50.18 | 7.37 | 0.65 |
| Mukran | DEU | 54.48 | 13.58 | 0.64 |
| Mulheim | DEU | 50.95 | 7.05 | 0.80 |
| Neckarsteinach | DEU | 49.43 | 8.80 | 0.65 |
| Neuss | DEU | 51.20 | 6.70 | 0.81 |
| Neuss/Dusseldorf | DEU | 51.20 | 6.70 | 0.81 |
| Neuwied | DEU | 50.43 | 7.48 | 0.72 |
| Nienburg | DEU | 52.63 | 9.22 | 0.59 |
| Nuremberg | DEU | 49.45 | 11.05 | 0.55 |
| Oldersum | DEU | 53.32 | 7.33 | 1.05 |
| Orsoy | DEU | 51.53 | 6.68 | 0.77 |
| Orth | DEU | 54.45 | 11.05 | 1.08 |
| Osnabruck | DEU | 52.27 | 8.03 | 0.58 |
| Papenburg | DEU | 53.08 | 7.38 | 0.67 |
| Passau | DEU | 48.58 | 13.47 | 0.52 |
| Peenemunde | DEU | 54.12 | 13.77 | 0.64 |
| Peine | DEU | 52.32 | 10.22 | 0.58 |
| Porz | DEU | 50.88 | 7.05 | 0.80 |
| Regensburg | DEU | 49.02 | 12.12 | 0.49 |
| Remagen | DEU | 50.57 | 7.22 | 0.69 |
| Rheinhausen | DEU | 51.42 | 6.73 | 0.79 |
| Rinteln | DEU | 52.20 | 9.08 | 0.57 |
| Rosslau | DEU | 51.90 | 12.27 | 0.60 |
| Rostock | DEU | 54.15 | 12.10 | 0.76 |
| Ruhrort | DEU | 51.45 | 6.73 | 0.79 |
| Salzgitter | DEU | 52.22 | 10.33 | 0.58 |
| Sassnitz | DEU | 54.52 | 13.63 | 0.64 |
| Speyer | DEU | 49.30 | 8.43 | 0.91 |
| Stralsund | DEU | 54.32 | 13.10 | 0.73 |
| Sturzelberg | DEU | 51.12 | 6.80 | 0.80 |
| Stuttgart | DEU | 48.78 | 9.20 | 0.67 |
| Tangermunde | DEU | 52.57 | 11.97 | 0.58 |
| Ueckermunde | DEU | 53.73 | 14.28 | 0.62 |
| Urdingen | DEU | 51.35 | 6.67 | 0.78 |
| Vallendar | DEU | 50.40 | 7.62 | 0.69 |
| Vierow | DEU | 54.10 | 13.57 | 0.72 |
| Walsum | DEU | 51.53 | 6.68 | 0.77 |
| Warnemunde | DEU | 54.18 | 12.08 | 0.79 |
| Weissenthurm | DEU | 50.42 | 7.48 | 0.72 |
| Wesel | DEU | 51.65 | 6.60 | 0.77 |

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|---|---|---|---|---|
| Wesseling | DEU | 50.83 | 7.00 | 0.75 |
| Westerende-Kirchloog | DEU | 53.43 | 7.42 | 1.02 |
| Wolgast | DEU | 54.05 | 13.78 | 0.64 |
| Worms | DEU | 49.63 | 8.35 | 0.85 |
| Wurzburg | DEU | 49.78 | 9.93 | 0.51 |
| Aggersund | DNK | 57.02 | 9.28 | 0.59 |
| Allinge | DNK | 55.28 | 14.80 | 0.66 |
| Fur | DNK | 56.83 | 9.00 | 0.57 |
| Gudhjem | DNK | 55.22 | 14.97 | 0.68 |
| Hammeren | DNK | 55.28 | 14.75 | 0.66 |
| Hammerhavn | DNK | 55.27 | 14.75 | 0.66 |
| Hasle | DNK | 55.18 | 14.70 | 0.66 |
| Hvalpsund | DNK | 56.68 | 9.20 | 0.42 |
| Logstor | DNK | 56.97 | 9.25 | 0.42 |
| Nekso | DNK | 55.07 | 15.15 | 0.63 |
| Nykobing | DNK | 56.80 | 8.87 | 0.64 |
| Ronne | DNK | 55.10 | 14.70 | 0.66 |
| Skarrehage | DNK | 56.95 | 8.87 | 0.59 |
| Skive | DNK | 56.57 | 9.03 | 0.43 |
| Stege | DNK | 54.98 | 12.28 | 0.67 |
| Struer | DNK | 56.50 | 8.60 | 1.04 |
| Stubbekobing | DNK | 54.88 | 12.03 | 0.50 |
| Svaneke | DNK | 55.13 | 15.15 | 0.63 |
| Tejn | DNK | 55.23 | 14.83 | 0.66 |
| Thisted | DNK | 56.95 | 8.70 | 0.53 |
| Vang | DNK | 55.27 | 14.75 | 0.66 |
| Bekker | EST | 59.45 | 24.67 | 0.42 |
| Dirhami | EST | 59.22 | 23.50 | 0.51 |
| Forby | EST | 59.00 | 23.17 | 0.49 |
| Haapsalu | EST | 58.95 | 23.53 | 0.45 |
| Heltermaa | EST | 58.87 | 23.07 | 0.45 |
| Kuivastu | EST | 58.58 | 23.40 | 0.45 |
| Kunda | EST | 59.52 | 26.55 | 0.45 |
| Lehtma | EST | 59.05 | 22.70 | 0.55 |
| Loksa | EST | 59.58 | 25.72 | 0.46 |
| Meeruse | EST | 59.45 | 24.68 | 0.42 |
| Miiduranna | EST | 59.50 | 24.82 | 0.51 |
| Montu | EST | 57.95 | 22.12 | 0.46 |
| Muuga | EST | 59.50 | 24.97 | 0.51 |
| Narva Joesuu | EST | 59.47 | 28.05 | 0.38 |
| Paldiski | EST | 59.35 | 24.05 | 0.52 |
| Paljassaare | EST | 59.45 | 24.70 | 0.42 |
| Parnu | EST | 58.38 | 24.48 | 0.44 |
| Peetri | EST | 59.45 | 24.73 | 0.42 |
| Prangli Island | EST | 59.63 | 25.00 | 0.46 |
| Rohukula | EST | 58.90 | 23.42 | 0.45 |
| Roomassaare | EST | 58.22 | 22.52 | 0.43 |
| Saaremaa Harbour | EST | 58.53 | 22.23 | 0.46 |
| Sillamae | EST | 59.40 | 27.78 | 0.38 |
| Tallinn | EST | 59.45 | 24.75 | 0.42 |

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|---|---|---|---|---|
| Veere | EST | 58.45 | 22.05 | 0.49 |
| Virtsu | EST | 58.58 | 23.55 | 0.44 |
| Dalsbruk | FIN | 60.03 | 22.52 | 0.45 |
| Frojdbole | FIN | 60.15 | 19.92 | 0.65 |
| Galtby | FIN | 60.18 | 21.58 | 0.56 |
| Hamina | FIN | 60.57 | 27.18 | 0.39 |
| Hanko | FIN | 59.82 | 22.97 | 0.55 |
| Helsinki | FIN | 60.17 | 24.95 | 0.42 |
| Houtskar | FIN | 60.22 | 21.37 | 0.57 |
| Imatra | FIN | 61.17 | 28.83 | 0.20 |
| Inkoo | FIN | 60.05 | 24.02 | 0.45 |
| Isnas | FIN | 60.40 | 26.00 | 0.39 |
| Joensuu | FIN | 62.60 | 29.75 | 0.30 |
| Joutseno | FIN | 61.13 | 28.48 | 0.20 |
| Kalajoki | FIN | 64.25 | 23.93 | 0.87 |
| Kantvik | FIN | 60.08 | 24.38 | 0.44 |
| Kaskinen | FIN | 62.38 | 21.22 | 0.66 |
| Kaukas | FIN | 61.07 | 28.22 | 0.19 |
| Kaukopaa | FIN | 61.25 | 28.87 | 0.21 |
| Kemi | FIN | 65.73 | 24.57 | 0.59 |
| Kokkila | FIN | 60.33 | 22.87 | 0.45 |
| Kokkola | FIN | 63.83 | 23.13 | 0.78 |
| Korpo | FIN | 60.15 | 21.55 | 0.56 |
| Kotka | FIN | 60.47 | 26.95 | 0.42 |
| Koverhar | FIN | 59.88 | 23.22 | 0.54 |
| Kristiinankaupunki | FIN | 62.27 | 21.32 | 0.42 |
| Kronvik | FIN | 63.05 | 21.52 | 0.42 |
| Kuopio | FIN | 62.85 | 27.50 | 0.27 |
| Kustavi | FIN | 60.57 | 21.33 | 0.45 |
| Kuuslahti | FIN | 63.12 | 27.75 | 0.28 |
| Lapaluoto | FIN | 64.67 | 24.42 | 0.52 |
| Lappeenranta | FIN | 61.07 | 28.25 | 0.19 |
| Lappohja | FIN | 59.90 | 23.27 | 0.54 |
| Lappvik | FIN | 59.90 | 23.27 | 0.54 |
| Lauritsala | FIN | 61.08 | 28.33 | 0.19 |
| Loviisa | FIN | 60.45 | 26.23 | 0.38 |
| Luvia | FIN | 61.33 | 21.57 | 0.43 |
| Mantyluoto | FIN | 61.58 | 21.50 | 0.44 |
| Martinniemi | FIN | 65.22 | 25.28 | 0.52 |
| Maxmo | FIN | 63.20 | 22.03 | 0.44 |
| Merikarvia | FIN | 61.85 | 21.47 | 0.44 |
| Mjosund | FIN | 60.22 | 22.47 | 0.45 |
| Mustola | FIN | 61.07 | 28.30 | 0.19 |
| Naantali | FIN | 60.47 | 22.02 | 0.45 |
| Nyhamn | FIN | 62.17 | 21.33 | 0.42 |
| Olkiluoto | FIN | 61.25 | 21.50 | 0.42 |
| Oulu | FIN | 65.00 | 25.47 | 0.50 |
| Parainen | FIN | 60.28 | 22.30 | 0.45 |
| Pateniemi | FIN | 65.08 | 25.40 | 0.51 |
| Perno | FIN | 60.45 | 26.05 | 0.39 |

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|---|---|---|---|---|
| Pietarsaari | FIN | 63.68 | 22.70 | 0.75 |
| Pori | FIN | 61.48 | 21.80 | 0.44 |
| Puhos | FIN | 62.10 | 29.92 | 0.27 |
| Raahe | FIN | 64.68 | 24.48 | 0.52 |
| Rahja | FIN | 64.20 | 23.73 | 0.51 |
| Rauma | FIN | 61.13 | 21.50 | 0.43 |
| Ristiina | FIN | 61.53 | 27.42 | 0.20 |
| Roytta | FIN | 65.77 | 24.15 | 0.58 |
| Salo | FIN | 60.38 | 23.17 | 0.45 |
| Savonlinna | FIN | 61.90 | 28.92 | 0.24 |
| Siilinjarvi | FIN | 63.08 | 27.67 | 0.27 |
| Sipoo | FIN | 60.37 | 25.32 | 0.41 |
| Skogby | FIN | 59.92 | 23.32 | 0.54 |
| Skoldvik | FIN | 60.30 | 25.55 | 0.40 |
| Skuru | FIN | 60.10 | 23.55 | 0.45 |
| Stromma | FIN | 60.18 | 22.90 | 0.45 |
| Summa | FIN | 60.53 | 27.12 | 0.39 |
| Svartback | FIN | 60.28 | 25.53 | 0.40 |
| Taalintehdas | FIN | 60.02 | 22.52 | 0.45 |
| Tammisaari | FIN | 59.98 | 23.43 | 0.44 |
| Teijo | FIN | 60.25 | 22.95 | 0.45 |
| Tolkkinen | FIN | 60.33 | 25.58 | 0.40 |
| Tornio | FIN | 65.85 | 24.15 | 0.58 |
| Tupavuori | FIN | 60.45 | 22.07 | 0.45 |
| Turku | FIN | 60.43 | 22.22 | 0.45 |
| Uusikaupunki | FIN | 60.80 | 21.40 | 0.45 |
| Vaasa | FIN | 63.10 | 21.62 | 0.42 |
| Valkom | FIN | 60.42 | 26.27 | 0.38 |
| Varkaus | FIN | 62.33 | 27.83 | 0.24 |
| Vartsala | FIN | 60.33 | 23.02 | 0.45 |
| Vastanfjard | FIN | 60.05 | 22.65 | 0.45 |
| Veitsiluoto | FIN | 65.70 | 24.62 | 0.59 |
| Abbeville | FRA | 50.10 | 1.85 | 1.03 |
| Annay sous Lens | FRA | 50.47 | 2.87 | 0.81 |
| Bethune | FRA | 50.53 | 2.63 | 0.83 |
| Bonnieres | FRA | 49.03 | 1.58 | 0.91 |
| Chalon-sur-Saone | FRA | 46.78 | 4.83 | 0.98 |
| Conflans | FRA | 48.98 | 2.10 | 0.97 |
| Duclair | FRA | 49.45 | 0.87 | 0.93 |
| Elbeuf | FRA | 49.28 | 1.12 | 0.90 |
| Gaillon | FRA | 49.17 | 1.32 | 0.88 |
| Grand Couronne | FRA | 49.37 | 0.98 | 0.93 |
| Grigny | FRA | 45.62 | 4.78 | 1.08 |
| La Mailleraye | FRA | 49.48 | 0.77 | 0.91 |
| Le Trait | FRA | 49.47 | 0.80 | 0.91 |
| Les Andelys | FRA | 49.25 | 1.43 | 0.87 |
| Lille | FRA | 50.65 | 3.08 | 0.81 |
| Lillebonne | FRA | 49.52 | 0.53 | 0.90 |
| Limay | FRA | 48.97 | 1.78 | 0.90 |
| Lyon | FRA | 45.77 | 4.83 | 1.09 |

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|---|---|---|---|---|
| Mantes | FRA | 48.98 | 1.72 | 0.90 |
| Paris | FRA | 48.87 | 2.33 | 1.04 |
| Petit Couronne | FRA | 49.37 | 1.00 | 0.93 |
| Port Jerome | FRA | 49.47 | 0.53 | 0.96 |
| Radicatel | FRA | 49.42 | 0.48 | 0.99 |
| Rouen | FRA | 49.48 | 1.08 | 0.91 |
| St. Etienne du Rouvray | FRA | 49.37 | 1.12 | 0.91 |
| St. Wandrille | FRA | 49.53 | 0.75 | 0.88 |
| Strasbourg | FRA | 48.57 | 7.70 | 0.85 |
| Vernon | FRA | 49.08 | 1.48 | 0.89 |
| Villeneuve-la-Garenne | FRA | 48.92 | 2.30 | 1.04 |
| Villeneuve-le-Roi | FRA | 48.73 | 2.40 | 1.07 |
| Villequier | FRA | 49.50 | 0.67 | 0.93 |
| Acton Grange | GBR | 53.37 | -2.63 | 0.93 |
| Alloa | GBR | 56.10 | -3.80 | 0.87 |
| Althorpe Wharf | GBR | 53.57 | -0.73 | 0.79 |
| Anderton | GBR | 53.27 | -2.52 | 0.85 |
| Aylesford | GBR | 51.27 | 0.47 | 0.90 |
| Barton | GBR | 53.47 | -2.37 | 0.84 |
| Beckingham | GBR | 53.40 | -0.83 | 0.77 |
| Beverley | GBR | 53.85 | -0.43 | 0.83 |
| Bowling | GBR | 55.93 | -4.50 | 0.79 |
| Burton upon Stather | GBR | 53.65 | -0.68 | 0.80 |
| Coulport | GBR | 56.07 | -4.88 | 0.90 |
| Dalmuir | GBR | 55.90 | -4.43 | 0.72 |
| Dingwall | GBR | 57.60 | -4.42 | 1.05 |
| Drax | GBR | 53.73 | -0.98 | 0.75 |
| Dumbarton | GBR | 55.93 | -4.57 | 0.84 |
| Dunglass | GBR | 55.93 | -4.52 | 0.79 |
| Faslane Dock | GBR | 56.07 | -4.82 | 0.81 |
| Finnart | GBR | 56.12 | -4.83 | 0.80 |
| Flixborough | GBR | 53.62 | -0.68 | 0.79 |
| Frodsham | GBR | 53.30 | -2.73 | 1.03 |
| Gainsborough | GBR | 53.40 | -0.77 | 0.76 |
| Garelochhead | GBR | 56.08 | -4.83 | 0.83 |
| Glasgow | GBR | 55.87 | -4.28 | 0.71 |
| Glenmallan | GBR | 56.12 | -4.82 | 0.78 |
| Gloucester | GBR | 51.87 | -2.22 | 0.89 |
| Goole | GBR | 53.70 | -0.87 | 0.79 |
| Gourock | GBR | 55.95 | -4.80 | 1.08 |
| Grove Wharf | GBR | 53.60 | -0.68 | 0.79 |
| Gunness | GBR | 53.58 | -0.72 | 0.79 |
| Gunness Wharf | GBR | 53.58 | -0.68 | 0.79 |
| Halling | GBR | 51.37 | 0.01 | 0.90 |
| Helensburgh | GBR | 56.02 | -4.73 | 1.07 |
| Howdendyke | GBR | 53.75 | -0.87 | 0.79 |
| Irlam | GBR | 53.43 | -2.42 | 0.86 |
| Irwell | GBR | 53.47 | -2.35 | 0.84 |
| Keadby | GBR | 53.60 | -0.67 | 0.79 |
| Kilcreggan | GBR | 55.98 | -4.82 | 1.08 |

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|---|---|---|---|---|
| Kinlochleven | GBR | 56.72 | -4.98 | 1.07 |
| Knottingley | GBR | 53.72 | -1.23 | 0.75 |
| Latchford | GBR | 53.38 | -2.57 | 0.90 |
| London | GBR | 51.50 | -0.07 | 0.93 |
| Manchester | GBR | 53.47 | -2.28 | 0.84 |
| Neap House | GBR | 53.62 | -0.67 | 0.79 |
| Northwich | GBR | 53.27 | -2.53 | 0.85 |
| Old Kilpatrick | GBR | 55.92 | -4.45 | 0.72 |
| Paisley | GBR | 55.85 | -4.43 | 0.72 |
| Partington | GBR | 53.43 | -2.43 | 0.86 |
| Perth | GBR | 56.40 | -3.43 | 0.78 |
| Port Glasgow | GBR | 55.93 | -4.68 | 1.00 |
| Renfrew | GBR | 55.87 | -4.40 | 0.72 |
| Rochester | GBR | 51.40 | 0.50 | 1.04 |
| Rosneath | GBR | 56.02 | -4.80 | 0.92 |
| Selby | GBR | 53.78 | -1.07 | 0.75 |
| Shandon | GBR | 56.05 | -4.82 | 0.81 |
| Snodland | GBR | 51.33 | 0.45 | 0.94 |
| Thorne | GBR | 53.62 | -0.97 | 0.78 |
| Warrington | GBR | 53.40 | -2.60 | 0.90 |
| Winnington | GBR | 53.28 | -2.52 | 0.85 |
| Wisbech | GBR | 52.65 | 0.15 | 1.05 |
| Aughinish Island | IRL | 52.63 | -9.05 | 1.09 |
| Dernish Island | IRL | 52.68 | -8.92 | 1.02 |
| Donegal | IRL | 54.65 | -8.10 | 1.06 |
| Limerick | IRL | 52.67 | -8.63 | 0.93 |
| Klaipeda | LTU | 55.72 | 21.13 | 0.56 |
| Engure | LVA | 57.17 | 23.23 | 0.42 |
| Labrags | LVA | 56.98 | 21.37 | 0.61 |
| Liepaja | LVA | 56.52 | 21.02 | 0.64 |
| Mersrags | LVA | 57.37 | 23.13 | 0.39 |
| Pavilosta | LVA | 56.90 | 21.18 | 0.61 |
| Riga | LVA | 56.97 | 24.10 | 0.44 |
| Roja | LVA | 57.50 | 22.82 | 0.40 |
| Salacgriva | LVA | 57.75 | 24.37 | 0.42 |
| Skulte | LVA | 57.32 | 24.40 | 0.43 |
| Ventspils | LVA | 57.40 | 21.55 | 0.61 |
| Chisinau | MDA | 47.02 | 28.83 | 0.98 |
| Aalst | NLD | 51.38 | 5.45 | 0.76 |
| Alblasserdam | NLD | 51.87 | 4.62 | 0.69 |
| Ameide | NLD | 51.95 | 4.95 | 0.69 |
| Amsterdam | NLD | 52.37 | 4.90 | 0.98 |
| Arnhem | NLD | 51.97 | 5.88 | 0.70 |
| Assen | NLD | 53.00 | 6.57 | 0.65 |
| Axel Sassing | NLD | 51.28 | 3.87 | 0.93 |
| Bergambacht | NLD | 51.93 | 4.78 | 0.69 |
| Bergen-op-Zoom | NLD | 51.50 | 4.27 | 0.95 |
| Bergum | NLD | 53.20 | 5.98 | 0.97 |
| Bolnes | NLD | 51.90 | 4.57 | 0.69 |
| Bruinisse | NLD | 51.67 | 4.10 | 0.86 |

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|---|---|---|---|---|
| Capelle aan den Yssel | NLD | 51.92 | 4.57 | 0.69 |
| Culemborg | NLD | 51.95 | 5.22 | 0.71 |
| Deest | NLD | 51.88 | 5.67 | 0.71 |
| Den Bommel | NLD | 51.72 | 4.28 | 0.83 |
| Dintelmond | NLD | 51.67 | 4.38 | 0.79 |
| Dinteloord | NLD | 51.63 | 4.37 | 0.80 |
| Dodewaard | NLD | 51.90 | 5.63 | 0.71 |
| Dordrecht | NLD | 51.80 | 4.65 | 0.69 |
| Drachten | NLD | 53.12 | 6.10 | 0.97 |
| Druten | NLD | 51.88 | 5.62 | 0.71 |
| Eindhoven | NLD | 51.43 | 5.50 | 0.76 |
| Fijnaart | NLD | 51.63 | 4.48 | 0.78 |
| Geertruidenberg | NLD | 51.72 | 4.87 | 0.74 |
| Gendt | NLD | 51.87 | 5.98 | 0.70 |
| Gorinchem | NLD | 51.82 | 4.98 | 0.74 |
| Grave | NLD | 51.75 | 5.75 | 0.72 |
| Groot-Ammers | NLD | 51.92 | 4.83 | 0.69 |
| Grouw | NLD | 53.10 | 5.85 | 0.99 |
| Hardinxveld | NLD | 51.82 | 4.85 | 0.69 |
| Heerenveen | NLD | 52.95 | 5.92 | 0.99 |
| Heerewaarden | NLD | 51.82 | 5.38 | 0.72 |
| Heerjansdam | NLD | 51.83 | 4.57 | 0.69 |
| Heijen | NLD | 51.68 | 5.98 | 0.72 |
| Hellevoetsluis | NLD | 51.82 | 4.13 | 0.92 |
| Hendrik Ido Ambacht | NLD | 51.85 | 4.62 | 0.69 |
| Heusden | NLD | 51.73 | 5.15 | 0.73 |
| Huissen | NLD | 51.92 | 5.92 | 0.70 |
| Kinderdijk | NLD | 51.88 | 4.63 | 0.69 |
| Krimpen aan den Yssel | NLD | 51.90 | 4.58 | 0.69 |
| Lekkerkerk | NLD | 51.92 | 4.63 | 0.69 |
| Lithoyen | NLD | 51.82 | 5.43 | 0.72 |
| Lobith | NLD | 51.87 | 6.13 | 0.71 |
| Maasbracht | NLD | 51.13 | 5.87 | 0.77 |
| Maashees | NLD | 51.57 | 6.03 | 0.75 |
| Maassluis | NLD | 51.92 | 4.25 | 0.75 |
| Maastricht | NLD | 50.85 | 5.68 | 0.75 |
| Made | NLD | 51.68 | 4.80 | 0.75 |
| Middelharnis | NLD | 51.78 | 4.20 | 0.86 |
| Millingen aan den Rijn | NLD | 51.87 | 6.03 | 0.71 |
| Moerdijk | NLD | 51.70 | 4.62 | 0.77 |
| Nieuw Lekkerland | NLD | 51.88 | 4.63 | 0.69 |
| Nieuwerkerk aan den Yssel | NLD | 51.97 | 4.58 | 0.69 |
| Nijmegen | NLD | 51.83 | 5.83 | 0.72 |
| Numansdorp | NLD | 51.72 | 4.42 | 0.81 |
| Odijk | NLD | 52.03 | 5.22 | 1.09 |
| Ooltgensplaat | NLD | 51.68 | 4.33 | 0.80 |
| Oosterhout | NLD | 51.62 | 4.87 | 0.75 |
| Oss | NLD | 51.77 | 5.52 | 0.72 |
| Ouderkerk | NLD | 51.93 | 4.60 | 0.69 |
| Oudewater | NLD | 52.03 | 4.88 | 1.03 |

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|---|---|---|---|---|
| Ouwerkerk | NLD | 51.63 | 3.98 | 0.95 |
| Overschie | NLD | 51.93 | 4.42 | 0.70 |
| Paal | NLD | 51.35 | 4.12 | 0.96 |
| Papendrecht | NLD | 51.83 | 4.63 | 0.69 |
| Raamsdonksveer | NLD | 51.70 | 4.92 | 0.74 |
| Renkum | NLD | 51.97 | 5.73 | 0.70 |
| Rhenen | NLD | 51.95 | 5.57 | 0.71 |
| Ridderkerk | NLD | 51.87 | 4.58 | 0.69 |
| Rijswijk | NLD | 51.78 | 5.02 | 0.73 |
| Roermond | NLD | 51.20 | 5.98 | 0.77 |
| Rotterdam | NLD | 51.90 | 4.48 | 0.70 |
| Sas van Ghent | NLD | 51.23 | 3.80 | 0.88 |
| Schiedam | NLD | 51.90 | 4.40 | 0.72 |
| 'sGravendeel | NLD | 51.77 | 4.60 | 0.69 |
| 'sHertogenbosch | NLD | 51.70 | 5.30 | 0.75 |
| Sliedrecht | NLD | 51.83 | 4.75 | 0.69 |
| Slikkerveer | NLD | 51.88 | 4.60 | 0.69 |
| Sluiskil | NLD | 51.30 | 3.83 | 0.94 |
| Spijk | NLD | 51.87 | 5.05 | 0.71 |
| St. Annaland | NLD | 51.62 | 4.10 | 0.77 |
| Stavenisse | NLD | 51.58 | 4.00 | 0.95 |
| Stein | NLD | 50.97 | 5.77 | 0.75 |
| Stellendam | NLD | 51.80 | 4.02 | 1.10 |
| Swalmen | NLD | 51.22 | 6.02 | 0.77 |
| Tegelen | NLD | 51.35 | 6.13 | 0.76 |
| Tiel | NLD | 51.88 | 5.45 | 0.71 |
| Tilburg | NLD | 51.55 | 5.07 | 0.74 |
| Venlo | NLD | 51.37 | 6.17 | 0.76 |
| Vlaardingen | NLD | 51.90 | 4.35 | 0.72 |
| Waalwijk | NLD | 51.70 | 5.07 | 0.73 |
| Wageningen | NLD | 51.97 | 5.67 | 0.71 |
| Walsoorden | NLD | 51.45 | 4.03 | 1.10 |
| Wanssum | NLD | 51.53 | 6.08 | 0.75 |
| Wartena | NLD | 53.15 | 5.90 | 0.82 |
| Werkendam | NLD | 51.80 | 4.90 | 0.69 |
| Willemstad | NLD | 51.68 | 4.40 | 0.79 |
| Wolphaartsdijk | NLD | 51.53 | 3.82 | 1.00 |
| Zaltbommel | NLD | 51.80 | 5.20 | 0.74 |
| Zeist | NLD | 52.08 | 5.23 | 1.09 |
| Zierikzee | NLD | 51.63 | 3.88 | 1.01 |
| Zuilichem | NLD | 51.80 | 5.12 | 0.73 |
| Zwijndrecht | NLD | 51.82 | 4.65 | 0.69 |
| Aagotnes | NOR | 60.40 | 5.02 | 1.04 |
| Aakra | NOR | 59.78 | 6.10 | 0.67 |
| Aalvik | NOR | 60.43 | 6.40 | 0.85 |
| Aandalsnes | NOR | 62.57 | 7.68 | 0.97 |
| Aardal | NOR | 61.23 | 7.68 | 1.06 |
| Aardalstangen | NOR | 61.23 | 7.70 | 1.06 |
| Alta | NOR | 69.97 | 23.25 | 0.86 |
| Anfiskaa | NOR | 66.28 | 14.10 | 0.98 |

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|---|---|---|---|---|
| Askoy | NOR | 60.40 | 5.17 | 0.90 |
| Balholm | NOR | 61.22 | 6.53 | 0.69 |
| Balsfjord | NOR | 69.32 | 19.35 | 1.06 |
| Bergen | NOR | 60.40 | 5.32 | 0.84 |
| Buvika | NOR | 63.32 | 10.18 | 0.94 |
| Bygstad | NOR | 61.38 | 5.67 | 0.86 |
| Dirdal | NOR | 58.78 | 6.23 | 0.83 |
| Dolvik | NOR | 60.32 | 5.25 | 0.88 |
| Eide | NOR | 60.52 | 6.72 | 0.88 |
| Eidfjord | NOR | 60.47 | 7.07 | 1.04 |
| Eikefet | NOR | 60.70 | 5.55 | 0.78 |
| Eikefjord | NOR | 61.60 | 5.47 | 1.02 |
| Eitrheimsneset | NOR | 60.10 | 6.53 | 1.00 |
| Elvebakken | NOR | 69.92 | 23.42 | 0.90 |
| Etne | NOR | 59.67 | 5.95 | 0.67 |
| Fiborgtangen | NOR | 63.72 | 11.17 | 0.53 |
| Finneid | NOR | 67.25 | 15.40 | 0.84 |
| Finnsnes | NOR | 69.23 | 17.97 | 1.06 |
| Fitjar | NOR | 59.92 | 5.28 | 1.07 |
| Flekkefjord | NOR | 58.30 | 6.67 | 0.97 |
| Florvaag | NOR | 60.45 | 5.22 | 0.78 |
| Follafoss | NOR | 63.98 | 11.10 | 0.64 |
| Forde (Fordefjord) | NOR | 61.45 | 5.85 | 0.83 |
| Forde (Fuglesetfjord) | NOR | 61.03 | 5.82 | 0.78 |
| Fusa | NOR | 60.20 | 5.62 | 0.77 |
| Garnes | NOR | 60.43 | 5.48 | 0.67 |
| Gaupne | NOR | 61.42 | 7.30 | 0.76 |
| Glaerem | NOR | 63.02 | 8.52 | 0.83 |
| Gullsmedvik | NOR | 66.33 | 14.15 | 0.98 |
| Hammerfall | NOR | 67.42 | 15.53 | 1.10 |
| Haugsvik | NOR | 61.83 | 5.00 | 1.04 |
| Hellesylt | NOR | 62.08 | 6.88 | 1.04 |
| Heroysund | NOR | 59.92 | 5.78 | 0.68 |
| Herre | NOR | 59.10 | 9.53 | 0.64 |
| Hjelmaas | NOR | 60.58 | 5.35 | 1.05 |
| Hommelvik | NOR | 63.42 | 10.80 | 0.62 |
| Hoyanger | NOR | 61.22 | 6.07 | 1.00 |
| Hoylandsbygdi | NOR | 59.77 | 5.78 | 0.66 |
| Hoylandssundet | NOR | 59.78 | 5.80 | 0.64 |
| Husnes | NOR | 59.87 | 5.77 | 0.68 |
| Kaupanger | NOR | 61.18 | 7.23 | 0.67 |
| Knarrevik | NOR | 60.37 | 5.17 | 0.90 |
| Kongsmoen | NOR | 64.88 | 12.43 | 0.86 |
| Kvinesdal | NOR | 58.30 | 7.00 | 0.78 |
| Laerdalsoyri | NOR | 61.10 | 7.48 | 1.08 |
| Laksevaag | NOR | 60.38 | 5.30 | 0.84 |
| Langangen | NOR | 59.08 | 9.80 | 0.87 |
| Langstein | NOR | 63.55 | 10.92 | 0.86 |
| Levanger | NOR | 63.75 | 11.30 | 0.54 |
| Lofallstrand | NOR | 60.02 | 6.00 | 0.47 |

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|---|---|---|---|---|
| Malm | NOR | 64.07 | 11.22 | 0.61 |
| Malvik | NOR | 63.42 | 10.63 | 0.61 |
| Menstad | NOR | 59.17 | 9.65 | 0.57 |
| Mo i Rana | NOR | 66.32 | 14.13 | 0.98 |
| Mosjoen | NOR | 65.83 | 13.18 | 0.99 |
| Muruvik | NOR | 63.43 | 10.85 | 0.60 |
| Namsos | NOR | 64.47 | 11.50 | 1.06 |
| Narvik | NOR | 68.43 | 17.43 | 0.96 |
| Naustdal | NOR | 61.52 | 5.72 | 0.99 |
| Norddal | NOR | 62.25 | 7.25 | 1.08 |
| Nordfjordeid | NOR | 61.90 | 6.02 | 0.90 |
| Nordveitgrend | NOR | 60.10 | 5.73 | 0.71 |
| Norheimsund | NOR | 60.37 | 6.15 | 0.90 |
| Nystrand | NOR | 59.10 | 9.72 | 0.95 |
| Odda | NOR | 60.07 | 6.55 | 1.00 |
| Olen | NOR | 59.60 | 5.83 | 0.62 |
| Omastrand | NOR | 60.22 | 5.97 | 0.66 |
| Onarheim | NOR | 59.95 | 5.65 | 0.75 |
| Orkanger | NOR | 63.32 | 9.85 | 0.80 |
| Orsta | NOR | 62.20 | 6.15 | 1.05 |
| Oystese | NOR | 60.38 | 6.22 | 0.78 |
| Porsgrunn | NOR | 59.13 | 9.65 | 0.64 |
| Raudsand | NOR | 62.83 | 8.10 | 0.93 |
| Rognan | NOR | 67.08 | 15.37 | 0.91 |
| Ronningen | NOR | 63.70 | 10.58 | 0.74 |
| Rosendal | NOR | 59.98 | 6.02 | 0.92 |
| Rubbestadneset | NOR | 59.82 | 5.28 | 0.89 |
| Sagvaag | NOR | 59.77 | 5.38 | 1.03 |
| Salsbruket | NOR | 64.80 | 11.88 | 0.90 |
| Sandane | NOR | 61.77 | 6.22 | 1.00 |
| Sandnes | NOR | 58.85 | 5.75 | 1.02 |
| Sauda | NOR | 59.65 | 6.35 | 0.84 |
| Skaalevik | NOR | 60.37 | 5.22 | 0.88 |
| Skaanevik | NOR | 59.75 | 5.93 | 0.67 |
| Skien | NOR | 59.20 | 9.62 | 0.60 |
| Sogndal | NOR | 61.23 | 7.10 | 0.68 |
| Sorreisa | NOR | 69.13 | 18.13 | 1.10 |
| Steinkjer | NOR | 64.02 | 11.50 | 0.59 |
| Stjordal | NOR | 63.45 | 10.88 | 0.60 |
| Stryn | NOR | 61.92 | 6.73 | 0.95 |
| Sunndalsora | NOR | 62.68 | 8.60 | 1.04 |
| Svelgen | NOR | 61.77 | 5.30 | 1.07 |
| Thamshavn | NOR | 63.33 | 9.87 | 0.80 |
| Trondheim | NOR | 63.43 | 10.40 | 0.61 |
| Trosvik | NOR | 59.05 | 9.70 | 1.06 |
| Tyssebotn | NOR | 60.62 | 5.58 | 0.66 |
| Tyssedal | NOR | 60.12 | 6.57 | 1.00 |
| Ulvik | NOR | 60.57 | 6.92 | 0.85 |
| Uskedal | NOR | 59.93 | 5.88 | 0.76 |
| Vaagland | NOR | 63.12 | 8.32 | 1.10 |

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|---|---|---|---|---|
| Vadheim | NOR | 61.20 | 5.82 | 0.82 |
| Vaksdal | NOR | 60.48 | 5.75 | 0.66 |
| Verdal | NOR | 63.78 | 11.43 | 0.55 |
| Vik (Sognefjord) | NOR | 61.08 | 6.58 | 0.78 |
| Volda | NOR | 62.15 | 6.07 | 1.05 |
| Darlowo | POL | 54.43 | 16.38 | 0.73 |
| Elblag | POL | 54.17 | 19.40 | 0.67 |
| Frombork | POL | 54.35 | 19.67 | 0.66 |
| Gdansk | POL | 54.35 | 18.65 | 0.57 |
| Gdynia | POL | 54.53 | 18.55 | 0.61 |
| Kolobrzeg | POL | 54.18 | 15.57 | 0.86 |
| Kozle | POL | 50.32 | 18.13 | 0.49 |
| Niechorze | POL | 54.10 | 15.07 | 0.79 |
| Nowa Sol | POL | 51.80 | 15.72 | 0.67 |
| Plock | POL | 52.53 | 19.67 | 0.50 |
| Police | POL | 53.55 | 14.60 | 0.81 |
| Puck | POL | 54.72 | 18.35 | 0.61 |
| Stepnica | POL | 53.65 | 14.63 | 0.81 |
| Swinoujscie | POL | 53.93 | 14.28 | 0.62 |
| Szczecin | POL | 53.42 | 14.55 | 0.79 |
| Tczew | POL | 54.08 | 18.77 | 0.61 |
| Ustka | POL | 54.58 | 16.87 | 0.64 |
| Wladyslawowo | POL | 54.80 | 18.42 | 0.62 |
| Wroclaw | POL | 51.08 | 17.00 | 0.51 |
| Bazias | ROM | 44.80 | 21.40 | 1.08 |
| Orsova | ROM | 44.70 | 22.37 | 0.90 |
| Annenskiy Most | RUS | 60.72 | 37.08 | 0.29 |
| Balakhna | RUS | 56.48 | 43.62 | 0.43 |
| Balakovo | RUS | 52.07 | 47.77 | 0.94 |
| Baltiysk | RUS | 54.65 | 19.90 | 0.59 |
| Belyy Ruchey | RUS | 60.90 | 36.83 | 0.30 |
| Berezniki | RUS | 59.43 | 56.82 | 0.49 |
| Brusnichnoye | RUS | 60.78 | 28.73 | 0.41 |
| Cheboksary | RUS | 56.13 | 47.23 | 0.50 |
| Cherepovets | RUS | 59.15 | 37.83 | 0.26 |
| Chkalovsk | RUS | 56.75 | 43.23 | 0.42 |
| Dudinka | RUS | 69.40 | 86.17 | 1.01 |
| Gorokhovets | RUS | 56.18 | 42.70 | 0.43 |
| Igarka | RUS | 67.50 | 86.67 | 0.91 |
| Kaliningrad | RUS | 54.72 | 20.52 | 0.63 |
| Kamyshin | RUS | 50.08 | 45.40 | 1.08 |
| Kanonerskiy Island | RUS | 59.90 | 30.22 | 0.45 |
| Kazan | RUS | 55.75 | 49.17 | 0.59 |
| Khabarovsk | RUS | 48.50 | 135.17 | 0.85 |
| Khatanga | RUS | 71.97 | 102.42 | 1.07 |
| Kineshma | RUS | 57.45 | 42.12 | 0.36 |
| Kirovsk | RUS | 59.87 | 30.98 | 0.43 |
| Komsomolsk-na-Amure | RUS | 50.53 | 136.98 | 0.66 |
| Kondopoga | RUS | 62.20 | 34.28 | 0.29 |
| Kostroma | RUS | 57.77 | 40.93 | 0.38 |

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|---|---|---|---|---|
| Kotlas | RUS | 61.25 | 46.65 | 0.41 |
| Krasnoyarsk | RUS | 56.08 | 92.77 | 0.56 |
| Kronshtadt | RUS | 60.00 | 29.77 | 0.42 |
| Lomonosov | RUS | 59.83 | 29.80 | 0.41 |
| Mago | RUS | 53.25 | 140.22 | 0.63 |
| Medvezhyegorsk | RUS | 62.93 | 34.47 | 0.35 |
| Mondoma | RUS | 59.93 | 37.47 | 0.28 |
| Murmansk | RUS | 68.97 | 33.08 | 0.87 |
| Naberezhnyye Chelny | RUS | 55.68 | 52.30 | 0.59 |
| Nadvoitsy | RUS | 63.93 | 34.33 | 0.42 |
| Naryan Mar | RUS | 67.65 | 53.02 | 0.85 |
| Navashino | RUS | 55.55 | 42.18 | 0.45 |
| Nikolayevsk | RUS | 53.13 | 140.72 | 0.67 |
| Nizhnekamsk | RUS | 55.42 | 51.88 | 0.59 |
| Nizhnetambovskoye | RUS | 50.93 | 138.17 | 0.59 |
| Nizhniy Novgorod | RUS | 56.33 | 44.00 | 0.43 |
| Nizhnyaya Gavan | RUS | 52.40 | 140.43 | 0.61 |
| Novgorod | RUS | 58.50 | 31.33 | 0.21 |
| Novocheboksarsk | RUS | 56.10 | 47.48 | 0.53 |
| Oleniy | RUS | 49.45 | 143.28 | 1.00 |
| Otradnoye | RUS | 59.77 | 30.80 | 0.43 |
| Pechora | RUS | 65.23 | 57.30 | 0.68 |
| Perm | RUS | 58.02 | 56.17 | 0.49 |
| Petrodvorets | RUS | 59.88 | 29.92 | 0.43 |
| Petrozavodsk | RUS | 61.77 | 34.32 | 0.29 |
| Pionerskiy | RUS | 54.93 | 20.20 | 0.61 |
| Podporozhye | RUS | 60.92 | 34.03 | 0.23 |
| Primorsk | RUS | 60.37 | 28.63 | 0.40 |
| Priozersk | RUS | 61.02 | 30.13 | 0.42 |
| Pudozh | RUS | 61.83 | 36.53 | 0.30 |
| Rybinsk | RUS | 58.02 | 38.87 | 0.30 |
| Samara | RUS | 53.17 | 50.17 | 0.76 |
| Saratov | RUS | 51.50 | 45.92 | 0.99 |
| Segezha | RUS | 63.70 | 34.32 | 0.41 |
| Shlisselburg | RUS | 59.93 | 31.13 | 0.43 |
| Solikamsk | RUS | 59.67 | 56.75 | 0.49 |
| Sosnovka | RUS | 56.23 | 51.28 | 0.56 |
| St. Petersburg | RUS | 59.93 | 30.30 | 0.45 |
| Svetlyy | RUS | 54.63 | 20.15 | 0.65 |
| Syzran | RUS | 53.17 | 48.48 | 0.79 |
| Tolyatti | RUS | 53.53 | 49.40 | 0.72 |
| Tomsk | RUS | 56.50 | 85.08 | 0.65 |
| Ust-Luga | RUS | 59.67 | 28.30 | 0.38 |
| Voznesenye | RUS | 61.02 | 35.47 | 0.25 |
| Vyborg | RUS | 60.72 | 28.73 | 0.41 |
| Vysotsk | RUS | 60.63 | 28.57 | 0.40 |
| Vytegra | RUS | 61.07 | 36.45 | 0.27 |
| Yakutsk | RUS | 62.02 | 129.73 | 0.99 |
| Yaroslavl | RUS | 57.57 | 39.87 | 0.36 |
| Zelenodolsk | RUS | 55.83 | 48.50 | 0.57 |

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|---|---|---|---|---|
| Apatin | SCG | 45.67 | 19.00 | 1.07 |
| Bezdam | SCG | 45.83 | 18.93 | 1.08 |
| Mitrovica | SCG | 42.90 | 20.87 | 0.58 |
| Novi Sad | SCG | 45.27 | 19.83 | 1.08 |
| Bratislava | SVK | 48.15 | 17.12 | 0.84 |
| Komarno | SVK | 47.77 | 18.08 | 0.93 |
| Aelvenaes | SWE | 59.37 | 13.18 | 0.06 |
| Ahus | SWE | 55.93 | 14.32 | 0.69 |
| Amal | SWE | 59.05 | 12.72 | 0.09 |
| Ar | SWE | 57.92 | 18.95 | 0.58 |
| Arvika | SWE | 59.67 | 12.58 | 0.07 |
| Backfors | SWE | 64.50 | 21.42 | 0.81 |
| Balsta | SWE | 59.55 | 17.55 | 0.49 |
| Bergkvara | SWE | 56.38 | 16.08 | 0.64 |
| Borgholm | SWE | 56.88 | 16.65 | 0.60 |
| Bungenas | SWE | 57.82 | 19.08 | 0.58 |
| Burea | SWE | 64.62 | 21.25 | 0.81 |
| Byxelkrok | SWE | 57.30 | 17.03 | 0.51 |
| Dalaro | SWE | 59.13 | 18.42 | 0.55 |
| Degerhamn | SWE | 56.35 | 16.42 | 0.63 |
| Edsvalla | SWE | 59.43 | 13.23 | 0.06 |
| Elleholm | SWE | 56.17 | 14.73 | 0.67 |
| Enkoping | SWE | 59.63 | 17.08 | 0.48 |
| Farjestaden | SWE | 56.65 | 16.47 | 0.62 |
| Farosund | SWE | 57.87 | 19.07 | 0.58 |
| Fiskeback | SWE | 57.87 | 14.10 | 0.18 |
| Fittja | SWE | 59.23 | 17.85 | 0.54 |
| Forsmark | SWE | 60.42 | 18.20 | 0.57 |
| Furillen | SWE | 57.77 | 19.00 | 0.51 |
| Furusund | SWE | 59.65 | 18.90 | 0.55 |
| Gamleby | SWE | 57.90 | 16.42 | 0.65 |
| Gefle | SWE | 60.67 | 17.17 | 0.43 |
| Grisslehamn | SWE | 60.10 | 18.82 | 0.57 |
| Gruvon | SWE | 59.33 | 13.12 | 0.08 |
| Hallekis | SWE | 58.67 | 13.42 | 0.14 |
| Hallstavik | SWE | 60.05 | 18.60 | 0.56 |
| Haparanda | SWE | 65.83 | 24.13 | 0.58 |
| Haraholmen | SWE | 65.23 | 21.63 | 0.53 |
| Hargshamn | SWE | 60.17 | 18.48 | 0.56 |
| Hasselby | SWE | 59.37 | 17.82 | 0.52 |
| Hernosand | SWE | 62.63 | 17.93 | 0.45 |
| Hoglunda | SWE | 59.42 | 13.25 | 0.06 |
| Hogmarso | SWE | 59.65 | 18.85 | 0.55 |
| Honsater | SWE | 58.63 | 13.45 | 0.14 |
| Hornefors | SWE | 63.62 | 19.90 | 0.47 |
| Hudiksvall | SWE | 61.72 | 17.12 | 0.59 |
| Iggesund | SWE | 61.65 | 17.10 | 0.59 |
| Kagehamn | SWE | 64.83 | 21.03 | 0.52 |
| Kalix | SWE | 65.85 | 23.13 | 0.63 |
| Kallvik | SWE | 57.88 | 16.72 | 0.68 |

| | | | | |
|---|---|---|---|---|
| Kallviken | SWE | 64.33 | 21.37 | 0.47 |
| Kalmar | SWE | 56.67 | 16.37 | 0.62 |
| Kalmarsand | SWE | 59.53 | 17.52 | 0.49 |
| Kapellskar | SWE | 59.72 | 19.00 | 0.57 |
| Kappelshamn | SWE | 57.85 | 18.78 | 0.58 |
| Karlshamn | SWE | 56.17 | 14.87 | 0.65 |
| Karlskrona | SWE | 56.17 | 15.60 | 0.63 |
| Karlstad | SWE | 59.38 | 13.52 | 0.07 |
| Klintehamn | SWE | 57.38 | 18.20 | 0.69 |
| Koping | SWE | 59.52 | 16.00 | 0.17 |
| Kopmannebro | SWE | 58.77 | 12.52 | 0.15 |
| Kristinehamn | SWE | 59.32 | 14.12 | 0.08 |
| Krokstad | SWE | 59.10 | 12.92 | 0.09 |
| Kungsor | SWE | 59.43 | 16.10 | 0.15 |
| Kyrkebyn | SWE | 59.27 | 13.07 | 0.08 |
| Landsort | SWE | 58.73 | 17.87 | 0.56 |
| Lidkoping | SWE | 58.50 | 13.17 | 0.17 |
| Liljeholmsviken | SWE | 59.32 | 18.00 | 0.54 |
| Ljustero | SWE | 59.52 | 18.63 | 0.50 |
| Loudden | SWE | 59.33 | 18.13 | 0.56 |
| Lulea | SWE | 65.58 | 22.17 | 0.56 |
| Mariestad | SWE | 58.72 | 13.83 | 0.13 |
| Marsviken | SWE | 58.67 | 16.95 | 0.51 |
| Mem | SWE | 58.48 | 16.42 | 0.47 |
| Monsteras | SWE | 57.03 | 16.47 | 0.65 |
| Morbylanga | SWE | 56.53 | 16.37 | 0.62 |
| Motala | SWE | 58.53 | 15.07 | 0.11 |
| Munksund | SWE | 65.28 | 21.48 | 0.54 |
| Norrkoping | SWE | 58.60 | 16.20 | 0.47 |
| Norrsundet | SWE | 60.95 | 17.17 | 0.42 |
| Norrtalje | SWE | 59.75 | 18.70 | 0.49 |
| Norsbron | SWE | 59.42 | 13.23 | 0.06 |
| Nykoping | SWE | 58.75 | 17.02 | 0.50 |
| Nynashamn | SWE | 58.90 | 17.95 | 0.56 |
| Oaxen | SWE | 55.97 | 17.72 | 0.60 |
| Orebro | SWE | 59.28 | 15.18 | 0.10 |
| Oregrund | SWE | 60.33 | 18.45 | 0.56 |
| Ornskoldsvik | SWE | 63.27 | 18.72 | 0.48 |
| Oskarshamn | SWE | 57.27 | 16.45 | 0.65 |
| Otterbacken | SWE | 58.95 | 14.05 | 0.11 |
| Oxelosund | SWE | 58.67 | 17.12 | 0.56 |
| Pataholm | SWE | 56.92 | 16.43 | 0.61 |
| Ronehamn | SWE | 57.17 | 18.53 | 0.65 |
| Ronneby | SWE | 56.17 | 15.30 | 0.63 |
| Ronnskar | SWE | 64.67 | 21.28 | 0.81 |
| Rundvik | SWE | 63.53 | 19.45 | 0.50 |
| Saffle | SWE | 59.13 | 12.93 | 0.09 |
| Sandhamn | SWE | 59.28 | 18.90 | 0.56 |
| Sankt Anna | SWE | 58.33 | 16.70 | 0.50 |
| Seskaro Island | SWE | 65.72 | 23.75 | 0.83 |

| | | | | |
|---|---|---|---|---|
| Sikea | SWE | 64.13 | 20.98 | 0.80 |
| Simpevarp | SWE | 57.42 | 16.67 | 0.68 |
| Simrishamn | SWE | 55.55 | 14.37 | 0.68 |
| Sjotorp | SWE | 58.83 | 14.00 | 0.13 |
| Skattkar | SWE | 59.42 | 13.70 | 0.07 |
| Skelleftea | SWE | 64.73 | 20.95 | 0.55 |
| Skoghall | SWE | 59.32 | 13.45 | 0.07 |
| Skutskar | SWE | 60.65 | 17.40 | 0.40 |
| Slite | SWE | 57.70 | 18.82 | 0.66 |
| Slottsbron | SWE | 59.33 | 13.10 | 0.08 |
| Soderhamn | SWE | 61.32 | 17.10 | 0.60 |
| Soderkoping | SWE | 58.48 | 16.33 | 0.47 |
| Sodertalje | SWE | 59.20 | 17.63 | 0.54 |
| Solvesborg | SWE | 56.05 | 14.58 | 0.66 |
| Soraker | SWE | 62.50 | 17.50 | 0.47 |
| Spesshult | SWE | 59.07 | 12.92 | 0.09 |
| Stavsnas | SWE | 59.28 | 18.68 | 0.55 |
| Stockholm | SWE | 59.32 | 18.05 | 0.56 |
| Stocksund | SWE | 59.38 | 18.05 | 0.55 |
| Stora Vika | SWE | 58.93 | 17.78 | 0.56 |
| Storugns | SWE | 57.83 | 18.80 | 0.58 |
| Straa | SWE | 57.90 | 19.03 | 0.58 |
| Strangnas | SWE | 59.38 | 17.03 | 0.48 |
| Studsvik | SWE | 58.75 | 17.28 | 0.51 |
| Sturko | SWE | 56.08 | 15.67 | 0.63 |
| Sundsvall | SWE | 62.42 | 17.33 | 0.51 |
| Taxinge | SWE | 59.22 | 17.37 | 0.50 |
| Torko | SWE | 56.15 | 15.40 | 0.63 |
| Trelleborg | SWE | 55.37 | 13.15 | 0.66 |
| Umea | SWE | 63.70 | 20.35 | 0.64 |
| Uppsala | SWE | 59.87 | 17.65 | 0.07 |
| Valdemarsvik | SWE | 58.20 | 16.60 | 0.48 |
| Vaxholm | SWE | 59.38 | 18.33 | 0.53 |
| Vesteras | SWE | 59.60 | 16.43 | 0.16 |
| Vestervik | SWE | 57.75 | 16.65 | 0.67 |
| Visby | SWE | 57.65 | 18.28 | 0.68 |
| Ystad | SWE | 55.43 | 13.83 | 0.63 |
| Cherkassy | UKR | 49.43 | 32.05 | 0.70 |
| Dneprodzerzhinsk | UKR | 48.50 | 34.62 | 0.89 |
| Dnepropetrovsk | UKR | 48.48 | 35.00 | 0.94 |
| Kiev | UKR | 50.42 | 30.50 | 0.62 |
| Kremenchug | UKR | 49.05 | 33.42 | 0.78 |
| Tyaginka | UKR | 46.75 | 33.05 | 1.02 |
| Zaporozhye | UKR | 47.83 | 35.17 | 1.07 |
| Albany | USA | 42.65 | -73.75 | 0.99 |
| Alpena | USA | 45.05 | -83.43 | 0.37 |
| Alsen | USA | 42.18 | -73.92 | 0.94 |
| Ashland | USA | 46.58 | -90.90 | 0.25 |
| Ashtabula | USA | 41.92 | -80.82 | 0.96 |
| Bangor | USA | 44.80 | -68.78 | 0.65 |

| | | | | |
|---|---|---|---|---|
| Bath | USA | 43.90 | -69.82 | 0.87 |
| Bay City | USA | 43.58 | -83.88 | 0.86 |
| Bayfield | USA | 46.80 | -90.80 | 0.15 |
| Belfast | USA | 44.42 | -69.00 | 0.98 |
| Benton Harbour | USA | 42.12 | -86.45 | 0.72 |
| Brevort | USA | 46.00 | -85.03 | 0.29 |
| Bucksport | USA | 44.57 | -68.80 | 0.80 |
| Buffalo | USA | 42.88 | -78.88 | 0.95 |
| Buffington | USA | 41.63 | -87.42 | 0.81 |
| Burns Harbour | USA | 41.63 | -87.18 | 0.81 |
| Calcite | USA | 45.40 | -83.78 | 0.23 |
| Catskill | USA | 42.22 | -73.88 | 0.94 |
| Cedarville | USA | 45.98 | -84.35 | 0.10 |
| Cementon | USA | 42.13 | -73.92 | 0.98 |
| Charlevoix | USA | 45.32 | -85.22 | 0.45 |
| Cheboygan | USA | 45.67 | -84.47 | 0.26 |
| Chicago | USA | 41.83 | -87.63 | 0.76 |
| Clayton | USA | 44.23 | -76.08 | 0.83 |
| Cleveland | USA | 41.52 | -81.72 | 1.03 |
| Conneaut | USA | 41.97 | -80.57 | 0.95 |
| Coxsackie | USA | 42.33 | -73.80 | 0.95 |
| Detour | USA | 45.97 | -83.88 | 0.09 |
| Detroit | USA | 42.33 | -83.03 | 0.86 |
| Duluth | USA | 46.73 | -92.15 | 0.07 |
| Erie | USA | 42.17 | -80.08 | 0.95 |
| Escanaba | USA | 45.78 | -87.07 | 0.41 |
| Essexville | USA | 43.60 | -83.83 | 0.86 |
| Fairport | USA | 41.77 | -81.32 | 1.01 |
| Ferrysburg | USA | 43.08 | -86.23 | 0.54 |
| Gary Harbour | USA | 41.60 | -87.35 | 0.79 |
| Grand Haven | USA | 43.07 | -86.25 | 0.56 |
| Grand River | USA | 41.73 | -81.28 | 1.00 |
| Green Bay | USA | 44.52 | -88.00 | 0.73 |
| Harbor Beach | USA | 43.83 | -82.65 | 0.43 |
| Holland (MI) | USA | 42.78 | -86.22 | 0.57 |
| Huron | USA | 41.40 | -82.58 | 1.09 |
| Hyde Park | USA | 41.78 | -73.93 | 0.98 |
| Indiana Harbour | USA | 41.67 | -87.50 | 0.81 |
| Kalama | USA | 46.02 | -122.83 | 0.89 |
| Kenosha | USA | 42.58 | -87.82 | 0.56 |
| Kewaunee | USA | 44.45 | -87.52 | 0.22 |
| Kingston | USA | 41.87 | -73.97 | 0.98 |
| Lorain | USA | 41.47 | -82.17 | 1.07 |
| Ludington | USA | 43.97 | -86.45 | 0.30 |
| Mackinaw City | USA | 45.75 | -84.73 | 0.28 |
| Manistee | USA | 44.25 | -86.33 | 0.28 |
| Manitowoc | USA | 44.10 | -87.63 | 0.26 |
| Marine City | USA | 42.72 | -82.48 | 0.66 |
| Marinette | USA | 45.12 | -87.62 | 0.51 |
| Marquette | USA | 46.60 | -87.38 | 0.00 |

|  |  |  |  |  |
|---|---|---|---|---|
| Marysville | USA | 42.92 | -82.48 | 0.65 |
| Menominee | USA | 45.13 | -87.62 | 0.49 |
| Milton | USA | 41.60 | -73.95 | 1.10 |
| Milwaukee | USA | 43.05 | -87.87 | 0.46 |
| Muskegon | USA | 43.18 | -86.23 | 0.49 |
| Newburgh | USA | 41.50 | -74.08 | 1.10 |
| Ogdensburg | USA | 44.70 | -75.50 | 0.73 |
| Olympia | USA | 47.05 | -122.90 | 0.92 |
| Ontonagon | USA | 46.87 | -89.30 | 0.11 |
| Oswego | USA | 43.47 | -76.53 | 0.84 |
| Port Dolomite | USA | 45.97 | -84.27 | 0.17 |
| Port Huron | USA | 42.98 | -82.43 | 0.65 |
| Port Inland | USA | 45.97 | -85.87 | 0.25 |
| Port Washington | USA | 43.38 | -87.87 | 0.36 |
| Portland (OR) | USA | 45.57 | -122.73 | 1.01 |
| Poughkeepsie | USA | 41.68 | -73.88 | 0.98 |
| Racine | USA | 42.73 | -87.80 | 0.56 |
| Ravena | USA | 42.47 | -73.80 | 0.97 |
| Rensselaer | USA | 42.65 | -73.73 | 0.99 |
| Rochester (NY) | USA | 43.28 | -77.60 | 0.73 |
| Rockport (MI) | USA | 45.20 | -83.38 | 0.23 |
| Rogers City | USA | 45.40 | -83.83 | 0.22 |
| Roseton | USA | 41.57 | -74.00 | 1.01 |
| Saginaw | USA | 43.45 | -83.92 | 0.89 |
| Sheboygan | USA | 43.75 | -87.70 | 0.21 |
| Silver Bay | USA | 47.28 | -91.27 | 0.42 |
| South Brewer | USA | 44.78 | -68.78 | 0.65 |
| South Haven | USA | 42.45 | -86.25 | 0.63 |
| St. Clair | USA | 42.82 | -82.47 | 0.66 |
| St. Joseph | USA | 42.08 | -86.50 | 0.74 |
| Stoneport | USA | 45.28 | -83.43 | 0.22 |
| Superior | USA | 46.72 | -92.08 | 0.07 |
| Taconite Harbour | USA | 47.50 | -90.92 | 0.40 |
| The Dalles | USA | 45.58 | -121.18 | 0.84 |
| Tonawanda | USA | 43.02 | -78.88 | 0.95 |
| Troutdale | USA | 45.53 | -122.38 | 1.02 |
| Troy | USA | 42.73 | -73.68 | 0.99 |
| Two Harbors | USA | 47.02 | -91.67 | 0.28 |
| Vancouver | USA | 45.63 | -122.67 | 1.01 |
| Waddington | USA | 44.85 | -75.20 | 0.68 |
| Waukegan | USA | 42.37 | -87.83 | 0.68 |
| Whitefish Point | USA | 46.75 | -84.95 | 0.04 |
| Willbridge | USA | 45.57 | -122.75 | 1.01 |
| Winterport | USA | 44.63 | -68.85 | 0.75 |
| Wiscasset | USA | 44.00 | -69.67 | 0.87 |
| Wyandotte | USA | 42.18 | -83.15 | 1.02 |
| Zilwaukee | USA | 43.47 | -83.92 | 0.88 |

Appendix H. Potential fouling NIS with high impact globally found at ports connected to GLSLR top ports.

| Species | Higher taxa | Ports | | | | | |
|---|---|---|---|---|---|---|---|
| | | CL[1] | DE[2] | DS[3] | MO[4] | QC[5] | ST[6] |
| *Acar plicata* | Mollusc | | | | | | X |
| *Acartia tonsa* | Crustacean | | | | X | X | X |
| *Acrothamnion preissii* | Plant | | | | X | X | |
| *Aglaothamnion halliae* | Algae | | | | X | X | X |
| *Alitta succinea* | Annelid | | | | X | X | X |
| *Amathia distans* | Bryozoan | | | | | | X |
| *Anadara inaequivalvis* | Mollusc | | | | X | X | X |
| *Anomia nobilis* | Mollusc | | | | | | X |
| *Antithamnionella ternifolia* | Algae | | | | X | X | X |
| *Asparagopsis armata* | Plant | | | | X | X | X |
| *Balanus improvisus* | Crustacean | | | | X | X | X |
| *Balanus trigonus* | Crustacean | | | | X | X | X |
| *Botryllus schlosseri* | Tunicate | | | | X | X | X |
| *Botryllus violaceus* | Tunicate | | | | X | X | X |
| *Brachidontes pharaonis* | Mollusc | | | | X | X | |
| *Bugula neritina* | Bryozoan | | | | X | | |
| *Carcinus maenas* | Crustacean | | | | | X | |
| *Carijoa riisei* | Cnidarian | | | | X | X | X |
| *Caulerpa racemosa var. cylindracea* | Plant | | | | X | X | X |
| *Cellana rota* | Mollusc | | | | X | X | X |
| *Cerithium scabridum* | Mollusc | | | | X | X | |
| *Ciona intestinalis* | Tunicate | | | | X | X | X |
| *Cladophora sericea* | Algae | X | X | X | X | X | X |
| *Cliona thoosina* | Porifera | | | | X | | X |
| *Codium fragile ssp tomentosoides* | Algae | X | X | X | X | X | X |
| *Codium webbiana* | Algae | | | | X | X | X |
| *Corbula gibba* | Mollusc | | | | X | X | X |
| *Cordylophora caspia* | Cnidarian | | | | X | X | X |
| *Crassostrea gigas* | Mollusc | | | | X | X | X |
| *Crepidula fornicata* | Mollusc | | | | X | X | X |
| *Didemnum cf. lahillei* | Ascidian | | | | X | X | X |
| *Didemnum vexillum* | Ascidian | | | | X | X | X |
| *Dreissena polymorpha* | Mollusc | X | X | X | X | X | X |
| *Dreissena polymorpha bugensis* | Mollusc | X | X | X | X | X | X |
| *Drymonema dalmatinum* | Cnidarian | | | | X | X | X |
| *Elminius modestus* | Crustacean | | | | X | X | X |
| *Eriocheir sinensis* | Crustacean | | | | X | X | X |
| *Ficopomatus enigmaticus* | Annelid | | | | X | X | X |
| *Fucus evanescens* | Algae | | | | X | X | X |
| *Garveia Franciscana* | Cnidarian | | | | X | X | X |
| *Geukensia demissa* | Mollusc | | | | X | X | X |
| *Hemigrapsus sanguineus* | Crustacean | | | | | X | X |
| *Hemimysis anomala* | Crustacean | | | | X | X | X |
| *Hydroides elegans* | Echinoderms | | | | X | X | X |
| *Hydroides ezoensis* | Annelid | | | | X | X | X |
| *Hydroides operculatus* | Annelid | | | | X | X | X |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Hypnea musciformis* | Algae | | | | X | X | X |
| *Jassa marmorata* | Crustacean | | | | | X | X |
| *Lophocladia lallemandii* | Algae | | | | X | X | X |
| *Lyrodus medilobatus* | Mollusc | | | | X | X | X |
| *Maeotias marginata* | Cnidarian | | | | X | X | X |
| *Membranipora membranacea* | Bryozoan | | | | X | X | X |
| *Molgula manhattensis* | Ascidian | | | | | | X |
| *Morone saxatilis* | Fish | | | | X | | |
| *Mya arenaria* | Mollusc | | | | X | X | X |
| *Myriophyllum spicatum L.* | Plant | | | | | | X |
| *Mytella charruana* | Mollusc | | | | | X | X |
| *Mytilicola orientalis* | Annelid | | | | X | X | X |
| *Mytilopsis sallei* | Mollusc | | | | X | | X |
| *Mytilus galloprovincialis* | Mollusc | | | | X | | X |
| *Orchestia cavimana* | Crustacean | | | | | | X |
| *Perna viridis* | Mollusc | | | | X | X | X |
| *Phyllorhiza punctata* | Cnidarian | | | | X | X | X |
| *Pinctada margaritifera* | Mollusc | | | | | | X |
| *Polyandrocarpa zorritensis* | Tunicate | | | | X | X | |
| *Polydora ciliata* | Annelid | | | | X | X | X |
| *Polydora cornuta* | Annelid | | | | X | X | X |
| *Polysiphonia brodiei* | Algae | | | | | X | |
| *Pontogammarus robustoides* | Crustacean | | | | X | X | X |
| *Pseudopolydora paucibranchiata* | Annelid | | | | X | X | X |
| *Rapana venosa* | Mollusc | | | | X | X | X |
| *Rhithropanopeus harrisii* | Crustacean | | | | X | X | X |
| *Sabella spallanzanii* | Annelid | | | | X | X | X |
| *Sargassum muticum* | Algae | | | | X | X | X |
| *Sphaeroma quoianum* | Crustacean | | | | | X | X |
| *Sphaeroma terebrans* | Crustacean | | | | X | X | X |
| *Spirorbis marioni* | Annelid | | | | X | X | X |
| *Styela clava* | Tunicate | X | X | X | X | X | X |
| *Stypopodium schimperi* | Algae | | | | X | X | X |
| *Synidotea laevidorsalis* | Crustacean | | | | X | X | X |
| *Teredo bartschi* | Mollusc | | | | X | X | X |
| *Teredo navalis* | Mollusc | | | | | X | |
| *Tricellaria inopinata* | Bryozoan | | | | X | X | X |
| *Tridentiger trigonocephalus* | Fish | | | | | X | |
| *Ulva fasciata* | Algae | | | | X | | |
| *Undaria pinnatifida* | Plant | | | | X | X | X |
| *Victorella pavida* | Bryozoan | | | | X | X | X |
| *Xenostrobus securis* | Mollusc | | | | X | X | X |

**Abbreviations:** Cleveland, Ohio[1]; Detroit-Ecorse, Michigan[2]; Duluth-Superior, Minnesota[3] ;Montréal, Québec[4] ;Québec City, Québec[5]; Sorel-Tracy, Québec[6].

Appendix I. Potential ballast-mediated NIS with high impact globally found at ports connected to GLSLR top ports.

| Species | Higher taxa | Ports | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | DS[1] | MO[2] | PM[3] | QC[4] | ST[5] | TH[6] | TO[7] |
| *Acartia tonsa* | Crustacean | | X | | X | X | | |
| *Acrothamnion preissii* | Plant | | X | | X | | | |
| *Aglaothamnion halliae* | Algae | | X | | X | X | | |
| *Alepes djedaba* | Fish | | X | | X | X | | |
| *Alexandrium catenella* | Algae | | X | | X | | | |
| *Alexandrium minutum* | Algae | | X | | X | X | | |
| *Alexandrium ostenfeldii* | Algae | X | X | | X | X | | X |
| *Alexandrium peruvianum* | Algae | | X | | X | | | |
| *Alexandrium taylori* | Algae | | X | | X | X | | |
| *Anadara inaequivalvis* | Mollusc | | X | | X | X | | |
| *Apollonia melanostoma* | Fish | X | X | X | X | X | X | |
| *Asparagopsis armata* | Plant | | X | | X | X | | |
| *Balanus improvisus* | Crustacean | | X | | X | X | | |
| *Botryllus schlosseri* | Tunicate | | X | | X | X | | |
| *Botryllus violaceus* | Tunicate | | X | | X | X | | |
| *Brachidontes pharaonis* | Mollusc | | X | | X | | | |
| *Bythotrephes longimanus* | Crustacean | X | X | X | X | X | X | |
| *Callinectes sapidus* | Crustacean | | X | | X | X | | |
| *Carcinus maenas* | Crustacean | | X | | X | X | | |
| *Caulerpa racemosa var. cylindracea* | Plant | | X | | X | X | | |
| *Caulerpa taxifolia* | Plant | | X | | X | | | |
| *Cercopagis pengoi* | Crustacean | X | X | X | X | X | X | |
| *Chara connivens* | Algae | | X | | X | X | | |
| *Charybdis hellerii* | Crustacean | | X | | X | X | | |
| *Chattonella aff verruculosa* | Algae | | X | | X | X | | |
| *Cliona thoosina* | Porifera | | | | | X | | |
| *Codium webbiana* | Algae | | X | | X | X | | |
| *Corbula gibba* | Mollusc | | X | | X | X | | |
| *Cordylophora caspia* | Cnidarian | | X | | X | X | | |
| *Coscinodiscus wailesii* | Diatom | | X | | X | X | | |
| *Crepidula fornicata* | Mollusc | | X | | X | X | | |
| *Dasya baillouviana* | Algae | | X | | X | X | | |
| *Didemnum cf. lahillei* | Ascidian | | X | | X | X | | |
| *Dreissena polymorpha* | Mollusc | X | X | X | X | X | X | X |
| *Dreissena polymorpha bugensis* | Mollusc | X | X | X | X | X | X | |
| *Elminius modestus* | Crustacean | | X | | X | X | | |
| *Eriocheir sinensis* | Crustacean | | X | | X | X | | |
| *Ficopomatus enigmaticus* | Annelid | | X | | X | X | | |
| *Gammarus tigrinus* | Crustacean | X | X | X | X | X | X | |
| *Garveia franciscana* | Cnidarian | | X | | X | X | | |
| *Gymnocwphalus cernuus* | Fish | X | X | X | X | X | X | |
| *Hemigrapsus penicillatus* | Crustacean | | X | | X | X | | |
| *Hemigrapsus sanguineus* | Crustacean | | X | | X | X | | |
| *Hemimysis anomala* | Crustacean | X | X | X | X | X | X | |
| *Heterosiphonia japonica* | Algae | | X | | X | X | | |
| *Hydroides ezoensis* | Annelid | | X | | X | X | | |

|  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| *Lithoglyphus naticoides* | Mollusc |  | X |  | X |  |  |
| *Littorina littorea* | Mollusc |  | X |  | X | X |  |
| *Lophocladia lallemandii* | Algae |  | X |  | X | X |  |
| *Maeotias marginata* | Cnidarian |  | X |  | X | X |  |
| *Marenzelleria neglecta* | Annelid |  | X |  | X | X |  |
| *Marenzelleria viridis* | Annelid |  | X |  | X | X |  |
| *Membranipora membranacea* | Bryozoan |  | X |  | X | X |  |
| *Microspongium globosum* | Algae |  | X |  |  | X |  |
| *Mnemiopsis leidyi* | Ctenophore |  | X |  |  | X |  |
| *Moerisia lyonsi* | Cnidarian |  | X |  | X | X |  |
| *Musculista senhousia* | Mollusc |  | X |  | X |  |  |
| *Mya arenaria* | Mollusc |  | X |  | X | X |  |
| *Mytella charruana* | Mollusc |  |  |  | X |  |  |
| *Mytilopsis leucophaeata* | Mollusc |  | X |  | X | X |  |
| *Neogobius melanostomus* | Fish |  | X |  | X |  |  |
| *Ostreopsis ovata* | Algae |  | X |  | X | X |  |
| *Percnon gibbesi* | Crustacean |  | X |  | X | X |  |
| *Perna perna* | Mollusc |  | X |  | X | X |  |
| *Perna viridis* | Mollusc |  | X |  | X | X |  |
| *Phyllorhiza punctata* | Cnidarian |  | X |  | X | X |  |
| *Polydora ciliata* | Annelid |  | X |  | X | X |  |
| *Polydora cornuta* | Annelid |  |  |  | X |  |  |
| *Pontogammarus robustoides* | Crustacean |  | X |  | X |  |  |
| *Potamopyrgus antipodarum* | Mollusc | X | X | X | X | X | X |
| *Prorocentrum minimum* | Diatom |  | X |  | X | X |  |
| *Pseudobacciger harengulae* | Annelid |  | X |  | X | X |  |
| *Pseudopolydora paucibranchiata* | Annelid |  | X |  | X |  |  |
| *Rapana venosa* | Mollusc |  | X |  | X | X |  |
| *Rhithropanopeus harrisii* | Crustacean |  | X |  | X | X |  |
| *Sabella spallanzanii* | Annelid |  |  |  | X |  |  |
| *Sargassum muticum* | Algae |  | X |  | X | X |  |
| *Spartina anglica* | Plant |  | X |  | X | X |  |
| *Strombus persicus* | Mollusc |  |  |  |  | X |  |
| *Styela clava* | Tunicate | X | X |  | X | X | X |
| *Theora lubrica* | Mollusc |  | X |  | X |  |  |
| *Undaria pinnatifida* | Plant |  | X |  | X | X |  |
| *Xenostrobus securis* | Mollusc |  | X |  | X |  |  |

**Abbreviations:** Duluth-Superior, Minnesota[1]; Montréal, Québec[2]; Presque Isle-Marquette, Michigan[3]; Québec City, Québec[4]; Sorel-Tracy, Québec[5]; Two Harbours, Minnesota[6]; Toronto, Ontario[7].